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TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1895.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1896.

The following papers and discussions have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the Boston Transcript. As here presented, the papers are printed in full, and the discussions are not only much fuller than in the weekly reports, but, where it appeared necessary, have been carefully revised by the speakers.

The Committee on Publication and Discussion take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature in the papers and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

J. D. W. French,
C. Minot Weld,
B. M. Watson, Jr.,
} *Committee on Publication and Discussion.*

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 5, 1895.

A duly notified stated meeting of the Society was holden at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair.

This being the commencement of the term of office of the new board of officers and standing committees, the President delivered the annual address as follows:

ADDRESS OF PRESIDENT KIDDER.

It is a custom of long standing for the President of this Society to say a few words at the first meeting in January. A pleasant custom, for then is an opportunity given to state what has been the tone of the year passed, and to express hopes and plans for the year just beginning.

We have just had a period of unusual anxiety. So well is this known, alas, that I need not have mentioned it. A good deal of daring would have been necessary to recommend any radical measure in the way of getting our long-coveted more commodious quarters. There seems at present very little promise of a material improvement in financial matters, and careful and cautious should still be our actions.

I told you last year that your Chairman needed a year to find out what the Society wanted, and that after that a second year was not any too much for carrying out what he found it desirable to do. It was gratifying to me to learn that you wanted me for another term, and I take this opportunity to thank you for the confidence you have shown in me.

In a matter of such moment as increasing the capacity of a Society like this, for that is what we want to do — not merely to

carry on the routine business, deliberation is, it seems to me, as important as push. We might easily buy a piece of land larger than this we now own, put up a building which we should find much more convenient than this, and at the end of two or three years find that we were not in the right place, and had not enough room after all.

This summer it became necessary to replace the boiler, and this was done as thoroughly as if we were to stay here forever. The entire cost was, however, but little over eight hundred dollars. Very few other repairs have been needed. This coming summer it will be necessary to do a great deal of repairing to the roof.

Perhaps my remarks have sounded as if I did not favor our moving, but I do most emphatically believe we should move, only not until we find the right place. And I think your Committee will find it yet.

On motion of Ex-President Spooner, it was voted, that the President be requested to furnish a copy of his address for publication.

The appropriations for Prizes and Gratuities, recommended by the Executive Committee on November 3, and then laid over until this meeting, came up for final action and were voted, as follows:

For Prizes and Gratuities:

For Plants, ...	$2,000
For Flowers, ...	2,500
For Fruits, ...	1,800
For Vegetables, ...	1,150
For Gardens, ...	500
And a special appropriation of one hundred dollars for prizes for Palms, etc., at the meeting of the American Carnation Society, in the Hall of this Society, February 21 and 22, 1895, ...	100
Total for Prizes and Gratuities, . .	$8,050

The President, as Chairman of the Executive Committee, reported from that Committee a recommendation that the Society make the following appropriations:

For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee, .	$400
For the Library Committee, for the purchase of magazines and newspapers, binding of books, and incidental expenses of said Committee, ...	400
For the same Committee, to continue the Card Catalogue of Plates, ...	100
For the Committee on Publication and Discussion, including the income of the John Lewis Russell Fund,	300
For the Committee on School Gardens and Children's Herbariums, this sum to cover all incidental expenses of said Committee, and to be paid through the usual channels, ...	250
For the salaries of the Treasurer and Superintendent of the Building, and the Secretary and Librarian, . .	3,000

These appropriations were unanimously voted.

The President also reported that the Executive Committee had appointed Charles E. Richardson to be Treasurer and Superintendent of the Building, and Robert Manning to be Secretary and Librarian for the year 1895.

The President further reported from the Executive Committee that they had voted to recommend to the Society the payment of $50 to William Castleton of East Boston, for his efficient services in extinguishing the recent fire in the Society's Hall. This appropriation was also voted by the Society.

The President reported in regard to the subject of a course of lectures by William Hamilton Gibson, referred to the Executive Committee at the last meeting of the Society, that they deemed it inexpedient to make any appropriation for that purpose.

On motion of William C. Strong, it was voted that the President appoint a Committee on School Gardens and Children's Herbariums for the year 1895. The President appointed as that Committee, the following named persons:

Mrs. Henrietta L. T. Wolcott, *Chairman.*

Henry L. Clapp,	William E. C. Rich,
George E. Davenport,	Miss Katharine W. Huston,
Mrs. P. D. Richards,	T. Otis Fuller.

J. D. W. French, Chairman of the Committee on Publication and Discussion, announced that the Schedule of Prizes for 1895 had been printed and a copy mailed to every member of the Society; and that the series of meetings for Discussion would commence on the next Saturday, with a paper entitled "A Day with our Birds," by Mrs. Kate Tryon, of Cambridge.

John G. Barker, Chairman of the Committee on Gardens, read the Annual Report of that Committee, which was accepted and referred to the Committee on Publication.

William C. Strong moved the following vote:

That a Committee of three members be appointed by the Chair, to consider the expediency of placing the property of the Society in the hands of a Board of Trustees, with authority to consult with legal counsel in reference thereto; and to report to the Society such recommendations as may appear desirable.

The motion was seconded by J. D. W. French, and carried in the affirmative. The Chair said that he would announce the Committee at the next meeting.

Mr. Strong moved that the Report of the Committee on the Revision of the Constitution and By-Laws, be taken up. This motion was carried, and the amendments proposed were, after two readings, approved by a majority vote, and ordered to be entered on the records, for consideration at the Stated Meeting on the first Saturday in April.

The Report was as follows:

The Committee to whom was referred the consideration of the Constitution and By-Laws of the Society, with special reference to Section VI, submit the following report:

A difference of opinion arose at the outset, as to the scope of the work to be done by the Committee. The prevailing opinion obtained, that we should review the entire code, and submit such suggestions as might seem desirable. Accordingly your Committee has held numerous sessions and given careful consideration to the various articles.

It does not appear to be necessary, or desirable, to make any radical changes in the present code. There are, however, some duties of the various officers, which it seems desirable to specify more distinctly. Some condensation and rearrangement of the articles, and a change of phraseology would also, in the opinion of your Committee, tend to more clearness.

In regard to Section VI, a decided difference of opinion still exists. A majority of your Committee recommend a change of phraseology of the second paragraph of the section, so as to make its meaning more clear.

The Board of Control of the State Agricultural Experiment Station having been merged with the Trustees of the Massachusetts Agricultural College, a change in Section II is necessitated thereby.

A copy of the various changes suggested by your Committee has been type-written, and is herewith submitted.

In connection with the consideration of the interests of our Society, and the largely increased valuation of its property, your Committee wish to suggest, and earnestly recommend, that its property be put in the care of a Board of Trustees, in order to its more secure and efficient management. To this end we recommend that legal counsel be employed to advise in regard to the mode of procedure.

WILLIAM NICHOLSON, of Framingham, and
LEONARD THOMPSON, of Woburn,

having been recommended by the Executive Committee for membership in the Society, were, on ballot, duly elected.

Adjourned to Saturday, February 2.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 12, 1895.

A Meeting for Lecture and Discussion was held today at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair.

Following is a synopsis of the Lecture, prepared by the author for this report:

DAYS WITH OUR BIRDS.

By Mrs. KATE TRYON, Cambridge.

When your Committee did me the honor to ask me to speak to you on my favorite subject, I at first felt it necessary that I should study long and well the food habits of my birds, that I

might not commit the mistake of recommending you to love any birds which, as horticulturists and agriculturists, you never could or never ought to love. Study I did,— with a result which can be summed up in two minutes. I thought it little worth while to repeat to you tales of the wonderful reproductive energy of noxious insects — you, who know but too well the sad facts of the case. I deemed it unnecessary to tell you at this late day — what you know very well — that birds were created by a wise Providence to keep this insect host in subjection. You know that the bird-haunted country is more fertile than the birdless country, and you know the punishment that has come to countries which, like France, have allowed their birds to suffer slaughter. You know that our own birds are not protected and encouraged as they should be. I feel certain that you, as students of Nature, are convinced of this. How, then, is it my duty to treat the subject of the hour? Certainly I should show myself unappreciative of my opportunity, did I not, above all, aim so to speak of your friends, the birds, as to stimulate new interest in them — so as to make you resolve that we must have more, not fewer, of them.

Fortunately or unfortunately for my subject this morning, I myself have had absolutely no experience as farmer or gardener, and shall not presume to decide whether or not the crow and the English sparrow must go. That problem is beyond me. I leave it for your Society, at some particularly lucid moment, to settle to your satisfaction. But if in that inspired discussion you should be anxious to find out which side of "the fence" I am on, perhaps I should exclaim with Thoreau: "Bless the Lord, O my soul! bless Him for wildness; bless Him for crows that won't alight within gunshot!" Apropos of the English sparrow question, I might suggest that the Almighty created him — though not in America; this, in all seriousness, for I cannot now consider the English sparrow a joking matter. "Do you think the English sparrow has driven our native birds away?" is the question a bird student meets everywhere. The questioner thinks affirmatively — that *all* our birds have been driven away. The fact is, this person never sees or hears birds anyway, and would scarcely know whether they went or staid. Perhaps as he came along the suburban street this very morning (in May), he passed a rose-breasted grosbeak, an oriole, a yellow warbler, and a red-eyed

vireo. Ah, yes, we have about us, in unexpected places, a wealth of bird-life. If everybody knew this, and appreciated it, we might be still more blessed as the years go on, for then everybody would contrive to keep natural shelter and food for the birds, and the birds would pay their board and lodging with interest.

After these introductory remarks, by means of stereopticon pictures of New England scenery and birds, the audience enjoyed a series of spring and summer bird-hunting strolls. First along an April road, a flock of crow-blackbirds were found, creaking and chucking in the tops of tall oaks. This bird, said the lecturer, bears an unpleasant reputation among growers of corn and fruit, and yet he is distinctly an insectivorous bird, and eminent authorities who have dissected hundreds of them, at all times of the year, find only trifling evidence of vegetable diet. Their case is precisely that of the robin. They are so gregarious and so numerous, that no ill-doing on their part escapes observation. If any one is inclined to shoot either of these birds, he should not do so before looking over such unbiased reports as those found in B. H. Warren's "Birds of Pennsylvania."

The bluebird's warble came from over the fields, very plainly suggested by the speaker's imitation, and the old favorite, in glowing plumage, was seen sitting on a fence-post. Here is a bird of whose usefulness there is never a question. Will not everybody who lives where bluebirds could possibly come, put out a house or a box to catch their fancy when they arrive in March? To be sure, the English sparrows, if present in your neighborhood, may take possession; still, the bluebird is a plucky fellow and knows how to look out for number one, as the purple martin knows to his sorrow.

The familiar song sparrow was heard and seen, singing beside the meadow brook, and his relations of the finch family were also introduced — the chipping sparrow with his hair nest in the orchard; the vesper sparrow of the dry hillside; the white-throated sparrow with his clear "Old Sam Peabody, Peabody, Peabody," whistle, and the handsome crimson finch (American linnet), with his craving for the spring buds of certain trees. But what matter for this? Did anyone ever miss the small number of leaves or orchard fruit that these birds nip in the bud? And how short is the season in which they can commit this mischief. Of

course if he takes a fancy to your blossoming trees, you may as well drive him off, for he has hundreds of useless wild or half-wild trees to go to.

The red-winged blackbird of the bushy swamp and overflowed meadow, is everywhere characteristic. His "tchuck!" and "gurglee!" are familiar to everybody. Redwings, with the robin and crow blackbird, repair to the ploughed land as soon as they come and these birds rid the soil of an incalculable number of noxious insect-grubs before the sowing. The dissector brings no bad record against this bird, and the cultivator who shoots them is very short-sighted, as regards his own interests. Indeed, to sum up this matter, a bird should never be shot because he *sometimes* offends. If he makes himself a nuisance for a week, or even a fortnight, he is making himself useful (although it may not be, indeed, in your particular neighborhood,) for the rest of the year. So that to grudge a bird an ear of corn is ill-treating the unpaid little workman, who made the crop possible. You *can* keep birds away from your crops, but to battle with the insect host is beyond all human ingenuity.

The golden winged woodpecker's resounding reveille came ringing over the countryside from the still leafless woods. This large, gaily marked woodpecker is known to every man or boy who has ever carried a gun. Alas, that this should be so! for here we have a truly famous eater of grubs and insects, gleaned from the soil as well as from the bark of trees. Farmers are often their own enemies, and never more certainly so than when they shoot for sport as they do, law or no law, "one er them air yaller hahmers," as they call them down in Maine. It is true, I suppose, that one woodpecker, the yellow-bellied sapsucker, decorates trees with those admirably even rows of holes, not for insects within the bark, but for the sap, the life-blood of the tree. But he doesn't spend all his time doing this, and he is now, in most localities, rare enough to cause regret to the bird-lover, and satisfaction to the forester.

The robin was the last of the spring birds treated. He is certainly fond of such dainty fruits as strawberries and cherries; but he has helped protect them from worse enemies. To shoot all the robins would be a dangerous experiment. From the economic point of view alone, no bird would be more missed.

The summer birds were seen in a June day's stroll through fields and groves near Boston. Each was interestingly characterized, often by original stories and imitations of notes and songs. Most prominent among these were the golden robin, kingbird, bobolink, rose-breasted grosbeak, red-eyed vireo, thrasher, scarlet tanager, indigo bird, chewink, cuckoo, the thrushes of the wood, blue jay, cedar bird, goldfinch, and some of the warblers, such as the redstart, yellow warbler, and Maryland yellowthroat. The haunt of each was shown on the screen, the bird itself in its natural colors and attitude.

The rose-breasted grosbeak, a bird now quite common in most Massachusetts towns, is known in Pennsylvania as the "Potato-bug bird," it being the only bird known to eat this pestiferous beetle.

In the above list of our common summer birds there are only two or three but are known as beneficial to the cultivator. Not far from the head of the list, for value, should be placed the red-eyed vireo and his numerous tribe, birds nearly allied to the fly-catchers proper. There are several species of these slim, little olive birds, and although they are little known, save to the bird-student, they doubtless far outnumber the robins. They prefer hard wood growth, chiefly maple, elm, and oak, and are common alike to forest, and suburban street.

As soon as one begins to make a study of bird-life, (which is of the utmost importance to one who tries to cultivate anything) the study of trees and shrubs obtrudes itself also. So attached is each species to a particular tree, or kind of copse, that the farmer or fruit grower might in time have a hand in choosing his bird-visitors or tenants by cultivating conditions liked by his favorite birds, and by omitting to cultivate conditions that might attract those which he considers his enemies.

Again the season is at hand in which we are to make the earth produce goodly fruits and pleasant flowers for our use and cheer. Let us add a new preparation this time — a new knowledge and appreciation of our feathered friends, without whom — did you ever think of it? — the earth could bear not even a blade of grass.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 19, 1895.

A Meeting for Lecture and Discussion was holden at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair.

The following paper was read by the author:

FLOWER POTS AND THEIR MANUFACTURE.

By A. H. HEWS, North Cambridge.

When your Committee recently invited me to give you a talk on "Flower Pots and their Manufacture," I was at first strongly tempted to decline, feeling myself to be but poorly gifted in that direction. But as the invitation went further and allowed me the alternative of reading a paper, it seemed hardly courteous or possible to refuse.

Some of you may be aware of the existence of a Centenary club in Philadelphia, to which I have the honor of belonging; but as it may be new to others, I take the liberty of mentioning it. My membership is due to the fact that, sometime previous to the year 1765, my great grandfather commenced manufacturing pottery in the town of Weston; and through three successive generations (my own being the fourth) the business has continued in the direct family line without a break. This makes our firm eligible to the Centenary club, which consists of firms that have had an uninterrupted ancestral record of one hundred years or more in the same business. Having alluded to the existence of this club, may I be permitted to mention an item or two in connection with it, which may be of interest to you.

Up to the present time we have found but thirty-one firms in the United States that can claim membership. The leading one among them is the Francis Perot's Sons Malting Company, established in 1687 — 208 years of unbroken business record. The account given us at our first annual dinner by a member of this firm, of the early days of the business and its varying fortunes — also of the interesting process of malt making — was in itself well worth the trip to Philadelphia. Another remarkable fact concerning this club is that of the thirty-one firms which compose it twenty-one are in the state of Pennsylvania.

No one knows better than myself that pages of dates and figures make very dry reading, and I will endeavor not to weary you with them. Yet if I could, at this time, tell you the year when our firm began to make flower pots, to whom they were sold, and at what prices, it might interest us all. Unfortunately there is a long break in our records.

Our oldest account book which I bring with me today as evidence, shows that the first entry reads as follows: "Weston, April 19, 1775, Lemuel Jones, to Ware, debtor: 0£ 2s 8d;" and on the same day, another: "Isaac Flagg, to Ware, Dr., 0£ 2s 7d." The next charges were made on the 29th of that month, and there were three of them. In May of the same year there were eight more. No further sales were recorded until February 20; whether of 1776 or the year following, the book fails to tell.

From this time to 1788 the record is again broken. But from 1788 to 1810, a period of twenty-two years, we have a continuous account. The charges during that entire term cover about as many pages as we now often use in one day; and the amount in dollars and cents does not compare with single sales of the year 1894.

I have taken time to reckon up the sales of three years. The charges were made, for the most part, in English money,—pounds, shillings, and pence. But I find that in June of 1801 the form of entry was changed temporarily to the then new American method of computing values in dollars and cents. This evidently perplexed the accountant, who after two entries went back to the familiar English money. In June of the next year they made a second attempt to keep the books by the American system of reckoning, and were again, it would seem, speedily discouraged.

It is a somewhat interesting and remarkable fact that a third attempt was made in June of 1803. The books became American once more, but even then for a short time only. After this third experiment, they became apparently disgusted with the simple scale of tens by which America had decided to regulate her monetary system. Doubtless they returned gladly to the more involved and complex calculations which familiarity had endeared to them. But at last in 1807, again in June, the fourth attempt was made — this time successfully. After that there was no return to the old English currency.

Through all these years the term "flower pots" does not once appear. Again the record is broken; and I very much regret that the books containing the first sale of flower pots and the name of the purchaser cannot be found.

Those of you who can remember the year 1861, will recall the depressed condition of business after war was actually declared, and the discouragements that seemed to hang over nearly all branches of industry and trade. The members of the Hews firm looked on the dark side and felt sure that there would be no demand for flower pots, they being more of a luxury than a necessity, and that the factory must close. At that time I succeeded in getting permission to make my first venture as salesman "on the road." Going first to C. M. Hovey, I secured from him what was a good order for those times, some 10,000 pots or more for the spring trade of 1862. Several other good orders were booked that day, and it is needless to say I went home happy.

Not once after that, during the four years that the old firm continued to exist, were they able during the busy seasons of spring and fall to fill all their orders for flower pots. Not that these orders were remarkably large or numerous, but they were beyond the capacity of the firm.

My own records date back to October, 1866. The title of the firm at that time was Horatio Hews & Son. The first sale recorded was to Joseph Holmes, Grocer, of Cambridgeport; the second to Hovey & Co., of Cambridge; the third to Frank Becker. The prices were from 33 1–3 to 50 per cent higher than those of today, which is more than I should be willing to admit of the relative excellence of the goods.

We first got fairly under way with machinery for making small flower pots in 1869. I well remember that my father, always disposed to be a little cautious, thought that we should overstock the country and ruin the prices. We did in that year what we thought was a wonderful business in flower pots. We exceeded it by 33 1–3 per cent in the month of October, 1894.

It would be interesting to describe the great craze of the American people in 1875 and 1876 for reproductions of art-pottery — how we looked through every museum this side of Washington for copies of the pre-historic shapes — and to give an account of our success in reproducing from the grand collection of Gen. Cesnola, and from his discoveries in ancient tombs at

Idalium, Cyprus, of forms which were supposed to be of Phœnician manufacture, and to have extended back over a period of 1,500 years before Christ. It would also be interesting to describe the quaint shapes from Dr. Schliemann's collection, taken by himself personally in his excavations on the supposed site of ancient Troy. Through the kindness of the late Professor Horsford, we received the first photographs of those which were sent to America, and had the shapes reproduced here before the originals had reached the museum.

In telling you about the manufacture of flower pots, I must confine myself to personal knowledge of the subject, for one might look through the libraries of the country and the encyclopedias of the world and find himself not a whit wiser about flower pot manufacture at the close of his investigations than at the beginning.

As I have never visited any such factories in European countries, my information concerning them has been derived mainly from workmen who have come from foreign potteries. They have uniformly felt and assured me that America is always in the lead in regard to all improved machinery.

Until about 1864 or 1865 common flower pots throughout the world had always been made by hand on the potter's wheel. There had been, indeed, many different forms of this wheel, but it had always been propelled by the movement of either hand or foot, and this meant of course constant actual labor, more or less wearisome. When in the early fifties a wheel was made to be propelled by the foot, with two sizes of pulleys and a balance wheel, whereby the speed of the wheel was increased in the proportion of three to one, it was thought that perfection had been reached.

Much time, though probably very little money, had been spent previously to this date in attempts to make a pot machine; and it was left to Mr. William Linton of Baltimore, an experienced practical potter, to perfect and patent the first machine.

From him we purchased two machines and the exclusive right to use them in this State; and within a short time we were able to make great improvements upon his patent; so that I feel perfectly safe in stating that, from time immemorial until down to about the year 1863, flower pots had always been made in one and the same way — by hand, on a potter's wheel.

Some of you may ask how many could be made in a day. When some of the boys in the old pottery "broke the record" by making one thousand three-inch pots in ten hours, I am sure it created as much excitement among the other workmen as a Harvard-Yale boating bulletin suspended in a store window seems now-a-days to arouse in the minds of Cambridge students.

Then came the machine, which, however, made only small pots, up to about five inches in size: and while it had previously taken an experienced man to make his thousand three-inch pots per day, a smart boy without any previous experience whatever, could, in the same number of hours make three thousand on the machine. This was back in the sixties. If I told you how many we make now per day, you might question my veracity.

As I have previously said, these machines do not successfully make pots larger than the five or six inch size, and when the standard pot was adopted a few years ago, the hand process was practically abandoned in the principal potteries of the country, and the use of what is technically termed a jigger succeeded it. This is a revolving disk propelled by machinery. These disks, or jigger-heads, are made of different sizes and fitted with various rings.

Plaster moulds are made in very large numbers for each size of pots, and the larger standard (from six to twelve inch) pots are all made at the present time in these moulds. With us, pots from twelve to twenty-four inches are made as of yore by hand on the wheel. The making of the pot is not, it should be explained, its only cost; previously to that comes the preparation of the clay. The hundred years from 1765 to 1865, saw no improvement in the process of preparing it for use. It was ground in a wooden tank or tub, the motive power being furnished by an ox. There is even a tradition to the effect that sometimes when the ox was busy a cow was substituted in his place. Personally I cannot vouch for such a statement; but the old horse in the mill I shall never forget. When I had reached the mature age of six years I was considered old enough to go to the factory, before and after school, and drive that horse to grind clay. As I loved my books no better than the average urchin of the same age does today, that was probably the only "grinding" I did.

The various other processes remained as crude in 1865 as they had been a century previous — the drying, firing, and all connected with the manufacture.

The capacity of our flower pot drying rooms of today far exceeds the entire product of any one year prior to 1865. At that time the custom of using wood for drying and firing pots still continued. It required three cords of white pine and from thirty to forty hours' labor thoroughly to fire a small furnace. Today three tons of bituminous coal will fire five times as much pottery in fifteen hours.

It is a very common saying that one flower pot is as good as another, provided it will hold together long enough to grow the plant; which is equivalent to saying that one rose is as good as another; and when they say that one pot is worth no more than another they might as well say that a hybrid should be sold at the price of a tea rose. It has always been our practice to make, at a fair manufacturing profit, the best flower pot that could be produced. The late C. M. Hovey has often said to me, "Mr. Hews, I want all perfect pots." Then he would go on to explain why he wanted all perfect pots. "You see, Mr. Hews," he would say, "I am potting a nice plant which will be worth two or three dollars and I want a nice straight pot for it, but I am obliged to pull the pile over before I can find one. Then when I have found it, it is sure to be of such a soft burn that it will hardly hold together." Then he would take me into the greenhouse and hunt for a nice plant and at the same time be very sure to select one that happened to be in a warped, cracked pot. "And now you see, Mr. Hews," he would say, "that pot just spoils the sale of the plant unless I re-pot it." That was before the day of standard pots, and I am sure no man would have appreciated the standard size more than he.

When the Society of American Florists met at Washington in 1892, I spent several hours in the greenhouses of the various departments, in company with a prominent member of the Horticultural Society, who had never happened to visit the city before. To a certain extent I had prepared him for the kind of flower pots he would find there. I think he would say, if he cared to discuss the subject, that I had not underestimated them. To say that many of them looked as though they belonged to that class of pottery found in the Indian Mounds of Mexico, would be a reflection on the aborigines.

The poor preparation of poor materials is largely the cause of the thousands of inferior flower pots that flood our markets.

Grades of clay used in the manufacture of flower pots are almost as numerous as the banks in which they are found, and require many different methods of treatment; and to proper treatment is largely due the excellence of the ware. Our bank in Cambridge contains a very superior quality of clay for flower pots. Unfortunately for us, it also contains very many small stones which must be disposed of in some way before using.

To separate the clay from the stone has always been a very perplexing as well as expensive operation, and we have spent many thousands of dollars to accomplish this end, and are still experimenting. Three years ago we erected at our clay bank an expensive factory for this express purpose, putting in machinery capable of handling six hundred tons daily, which produced one hundred tons of sifted clay. A short description of this process may be interesting to you.

The clay is first ploughed by means of a horse and capstan, whereby one horse will do the work of twenty men with picks. This clay is then loaded in dump carts and carried to the mill, where it is shovelled through a disintegrator which expels the larger stones and crushes the smaller ones. It then falls on an endless belt and is carried to a revolving dryer. This is a new western patent, wherein by the use of crude petroleum for heat, we evaporate from twenty to twenty-five per cent of moisture from the clay, and while it passes through a direct blaze of white heat there is sufficient moisture all the time to prevent it from burning, which at this stage would make it worthless. To demonstrate this point beyond question, paper and dry shavings were passed through with the clay, and they came out without even scorching.

From the dryer it goes into large bins, where it must remain twenty-four hours, so that portions of it which have become too dry and hard may absorb the moisture from that not dry enough. From these bins it is carried to whippers, which beat the clay without further crushing the stone. From the whipper it goes to the revolving screens, and thence to the elevators.

The next process is mixing, or, as we term it, pugging, the clay, which is all done by machinery. From one machine it comes out very soft and plastic, to be worked in plaster moulds; from the other cut into hard cubes for the iron moulds of the machine.

The pot machine and jigger of today does each the work of from six to eight men at the wheel, even at as late a date as 1885.

The difference in cost between a good and a poor pot is very slight, and if the florist will demand and accept nothing but a first class pot, a standard in quality as well as in size will soon be reached. Some may ask what constitutes a standard in quality, and I would thus define it. To be standard in quality a pot must be made of clay properly prepared, be of uniform firing and of a smooth surface inside as well as out. It must also be of right porosity, which can be accomplished by the proper mixture of clay, and on a machine-made pot must have a smooth rim on the inside, so that the man standing at his bench, potting thousands of plants per day as is being done constantly in large establishments, may have some flesh on his thumbs at night and more time for recreation than he otherwise would have, if he felt obliged to ask forgiveness for his forcible denunciation of the rough edged pots furnished by many manufacturers. It must also be one that will stand transportation and years of usage if necessary.

The practical florists, and there are a good many of them, were long ago convinced that the best pots are the cheapest.

Before asking forgiveness for having trespassed so long on your patience I want to say a few words about ornamental flower pots, now commonly called "jardinieres." For some years there has been a constantly increasing demand for ornamental coverings for flower pots, and we have depended very largely for these upon articles of foreign manufacture. During the past year we have paid special attention to this branch of the trade, and have produced shapes and designs second to none, have imitated glazes so perfectly that it takes an expert to detect the difference between the real and the imitation, and withal have produced these jardinieres at prices which place them within the reach of every one.

I often ask myself whether it is probable that the demand for flower pots in the next quarter of a century will increase in the same ratio as during the past quarter. And having the books at hand I simply took the total manufactures of 1869 and 1894, and found the increase as ten to one, or in round numbers 700,000 flower pots in the former year and 7,000,000 in the latter; and if the same factory can in 1920, twenty-five years later, produce and sell 70,000,000 we shall verily be living in a land of flowers.

Discussion.

Samuel H. Warren asked whether the painting of flower pots was injurious to the pots, or to the plants grown in them.

Mr. Hews replied that if the plant was properly watered, no injury would result from the paint. He also remarked that one experienced plant-grower said "we shall not reach perfection in growing plants in pots, until we do away with porous pots, and thus avoid the growth of green mould upon the outside of the pots when in use." The Japanese always grow plants in glazed pots.

William C. Strong said that if we can have our pots burned so hard that green moss will not grow upon them, it will be an improvement of great value.

Mr. Hews remarked that F. L. Harris, of Wellesley, always wants the hardest pots, and added that his firm sent a schooner load of hard burned pots to Port-of-Spain, the capital of the island of Trinidad, to a firm who grow palms there.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, January 26, 1895.

A Meeting for Lecture and Discussion was holden today at eleven o'clock, the President, Nathaniel T. Kidder, in the chair.

The following lecture was delivered on the John Lewis Russell Foundation.

Fungous Diseases of Ornamental Plants.

By Professor Byron D. Halsted, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N. J.

In the brief time that is before us it may be well to make a visit to some large grower of ornamental plants under glass, and pass from house to house upon a tour of inspection. This series of greenhouses will be ideal in the sense of offering examples of many of the leading kinds of fungous troubles.

Without further preliminary parley we will consider ourselves as having arrived upon the grounds of our florist friend, who gives us the freedom of his houses while we discuss the subjects that are to come before us.

Fungous Diseases of the Rose. First let us pass into the rose houses. No less than one hundred and sixty-five kinds of fungous diseases of the rose are recorded in the books, and therefore only a few of the most injurious can be mentioned here.

The Black Spot (*Actinonema rosæ* Fr.) Fig. 1, a, is perhaps the most wide-spread and troublesome of the fungous diseases of the rose. It was first described in 1826 and is so common as scarcely to need mention other than by name, to be brought to the mind of every rosarian. The foliage when attacked by the Actinonema fungus soon develops the characteristic dark circular spots, while elsewhere the leaves become pale and shortly fall to the ground. A house of roses badly affected with the Black Spot will show a lack of leaves, particularly upon the older parts of the plants, and of course the quantity and quality of the blooms are unsatisfactory.

The compound microscope reveals that the fungus consists of fine threads which feed upon the substance of the rose leaf. Starting at a given point from a spore that has been brought through the air or in water from a mature black spot, the fungus spreads in diverging lines until the circular area is the size of a dime or even a half dollar. After the growth has proceeded for a time small specks may be seen upon the surface of the spot. These are the spore-bearing places, after the skin of the leaf has been ruptured or thrown off, and multitudes of spores are produced. These spores, small as particles of dust, and as numerous as the sands of the sea-shore, are the "seeds" or the germs of the fungus and are capable, after finding their way to a healthy leaf, of inaugurating a new Black Spot.

As with many other fungous diseases of plants, some varieties of roses are much more susceptible to the Black Spot than others, and therefore it goes without further saying that, other matters remaining the same, it is an important precaution to grow those sorts that are the least subject to the malady.

As we glance around in the imaginary rose house, much of the foliage is observed to be more or less covered with a powdery substance (mildew), as if the fine dust from a flouring mill had settled upon the leaves, many of which are somewhat misshapen. This powdery substance consists largely of the spores of a fungus (*Sphærotheca pannosa* Wallr.) that bears the familiar name of Rose Powdery Mildew, Fig. 1, c. This fungus is a surface feeder and does not send its filaments deeply into and between the cells of the leaf. In its habit of growth, therefore, this fungus is quite in

contrast with that causing the Black Spot. Because superficial in its manner of feeding upon its host this mildew can spread rapidly over the rose leaves and quickly become manifest.

There is another rose mildew (*Peronospora sparsa* Berk.) which differs in many ways from the one last mentioned. It is deeply seated, in that its fine filaments penetrate through all portions of the leaf and afterwards produce upon the surface a fine growth that has suggested the common name of Downy Mildew for this fungous parasite. This mildew is closely related to the ones upon the grape, the onion, the greenhouse lettuce, and several other of the destructive downy mildews.

As we pass along through the rose house some plants are seen to be nearly defoliated. An inspection of the canes will show that they are covered with small pimples, each one of which abounds in spores. These microscopic spores ooze from the pimples or small rifts in the epidermis of the cane and germinate quickly and spread the trouble. This is the Rose Anthracnose (*Glœosporium rosœ* Hals.) and is not distantly related to several of the worst diseases of other cultivated plants. Thus *Glœosporium fructigemium* Berk., is a widespread fungous trouble, causing bitter or ripe rot in apples, grapes, and other fruits. The somewhat fatal anthracnose of the raspberry (*Glœosporium venetum* Speg.) is another near relative of the trouble in hand. The rose plant is most likely attacked through its young parts by the spores of the anthracnose falling upon the leaves or succulent canes and, if the latter, it may girdle the stem and thereby kill it. A plant thus infested by the anthracnose may send up new canes from near the base of the stem, which in turn are likely to bear pale sickly foliage and finally to be destroyed by the fungus that in this instance may spread to it directly from the old stem. This is one of the most contagious of the fungous diseases of the rose.

Some of the plants in the rose house have foliage that is badly marked with gray, irregular, often quite small spots. If these spots are looked at closely — and a hand lens will assist greatly — they are seen dotted over with minute black specks, the spore-bearing organs of *Sphœrella rosigena* Ell., Fig. 1, b. In order that this trouble may have a common name and to avoid the word spot and any confusion with Black Spot the expression Rose Leaf Blight is proposed.

Before we leave the roses, and in answer to a question that has already been asked, I may say that the peculiar discoloration of

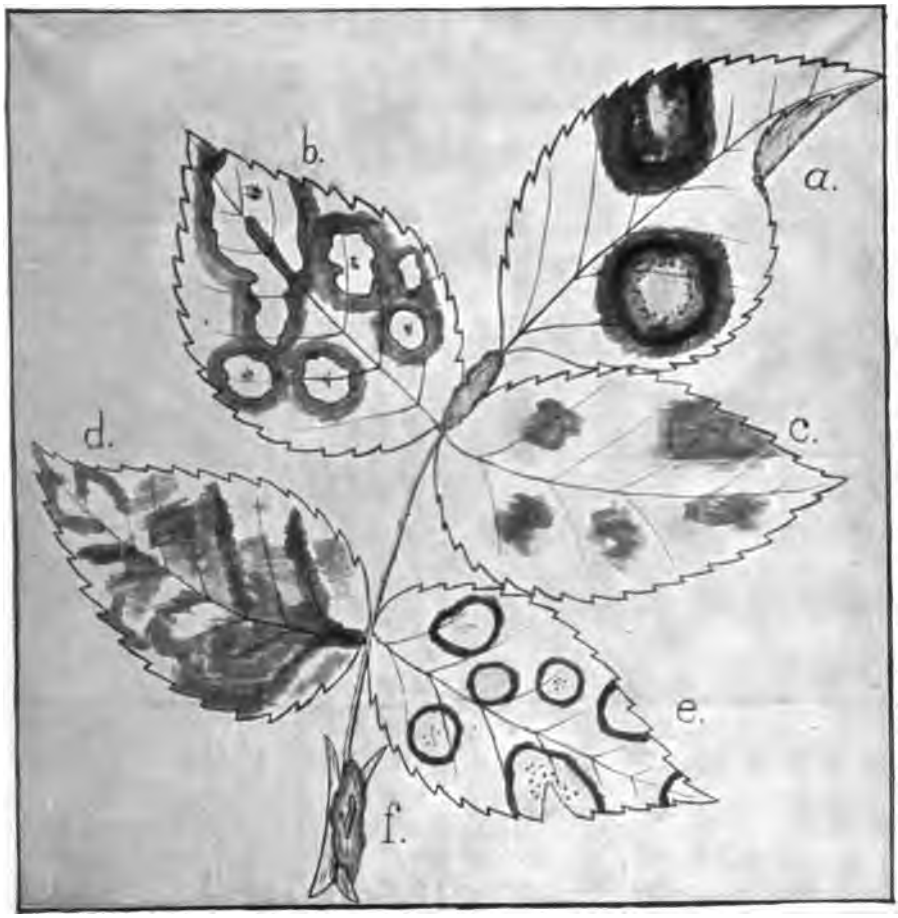

Fig. 1.

the leaves of La France, Fig. 1, d, which may for the lack of a better term be called "bronzing", is, so far as I know, not of fungous origin but probably due to a structural weakness permitting the skin to become scalded by too great sun exposure. We will now pass into the Carnation houses.

Fungous Diseases of the Carnation. The leading fungous enemy of the Carnations today is the Carnation Rust (*Uromyces Caryophyllinus* Schr.) This fungus, while quite new to this country, is an old pest in Europe, and doubtless came to us in imported stock, and within the past five years has spread throughout the country. The rust can be quickly distinguished by the plump gray blisters produced upon the leaves and stems. After the epidermis is broken the rusty brown spores escape in great numbers and the affected spots then resemble those produced by other rust fungi upon grains, grasses, and many other plants. Before the time of spore-formation the fungus has sent its slender threads in all directions through the leaf or stem, and the plant has become badly diseased.

The work of the Carnation Leaf Spot fungus (*Septoria Dianthi* Desm.) is easily recognized by the light brown patches upon the leaf and stem. While not confined to any portion of the plant, upon the stem it is most frequently found between joints. The lower half of the leaf usually has more spots than the upper half, and frequently a leaf bends abruptly downward near the middle when a large spot has weakened it at that point. Occasionally a leaf may have several bends downward and sidewise, due to as many diseased spots. Over the light brown (sometimes reddish) affected areas, there develop a number of minute black specks, which in an old spot can be readily seen with the naked eye. These specks consist of flask-shaped bodies, the walls of which are formed of the interwoven threads of the fungus, and upon the inside a vast number of long needle-shaped spores are produced. The spores, mingled with a viscid substance, ooze from the small opening through the wall of the flask and afterwards become disseminated in various ways. In some of the fungi previously mentioned, the spores have been described as produced without cover upon the surface of the plant, but in the Carnation Septoria the surface is finally reached by the discharge through an opening. When lying upon the surface they may be moved when dry by currents of air, as motes float in a sunbeam. On the other hand any stream of water never so small can carry them along.

In case of plants under glass where watering is frequent it is likely that the wet method of transportation is most active, especially if the hose is used with considerable force. A strong spray playing upon a healthy plant through one affected with the Leaf Spot would be quite sure to carry along an abundance of the spores and leave them in drops of water in a suitable condition for germination. The prevalence of the disease at the base of the clasping leaves of the carnation may be due to the fact that the water is held there longer than elsewhere.

The Carnation Anthracnose (species not fully determined) is a third fungous trouble frequently met with, and may be characterized by sharp-pointed black hairs arranged in microscopic rosettes upon the surface of stem or leaf. The spores are borne upon the tips of radiating threads intermingled with the black hairs. This fungus is fond of moisture and is most frequently found upon the lower stems and leaves that lie upon the earth or are matted together. A whole branch may be destroyed by the anthracnose that has affected its base and checked the flow of sap.

The Leaf Mould (*Heterosporium echinulatum* Berk.) is a fourth fungous trouble of the Carnation, which is easily distinguished by its forming circular spots in the foliage varying from a small dot to a ring extending across the whole leaf. At first the spot is of a pale ashy color covered with a dense mould, but changes with age to a dark brown. This change of color is due to the maturing, upon the minute branches of the mould, of many spores. When fully ripe the spores are covered with microscopic prickers. In its worst form a plant, and particularly the younger portion, will be literally covered with the blending circular spots of this fungus.

The last fungous disease of the Carnation to be mentioned before passing on to the violet houses is of bacterial origin. The germs of this disease are exceedingly small, there being no thread-like structure or spores as met with in the fungi previously mentioned. Attention is attracted to the victim by the manifest lack of vigor, and the consequent failure to produce the usual number of blooms. If a leaf of a diseased plant is held up to the light many somewhat transparent dots will be observed, varying from a mere point to specks an eighth of an inch in diameter. These dots are the starting points of the bacteria which, swarming in the cells of a leaf, destroy the ordinary green substance (chlorophyll), and finally the leaf becomes discolored and lifeless.

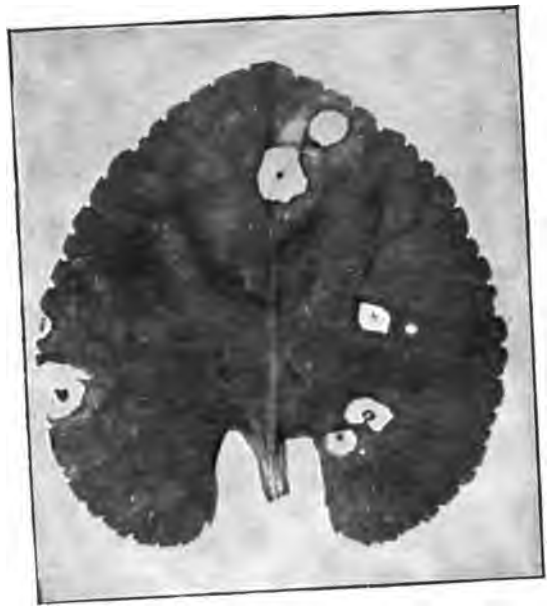

Fig. 2.

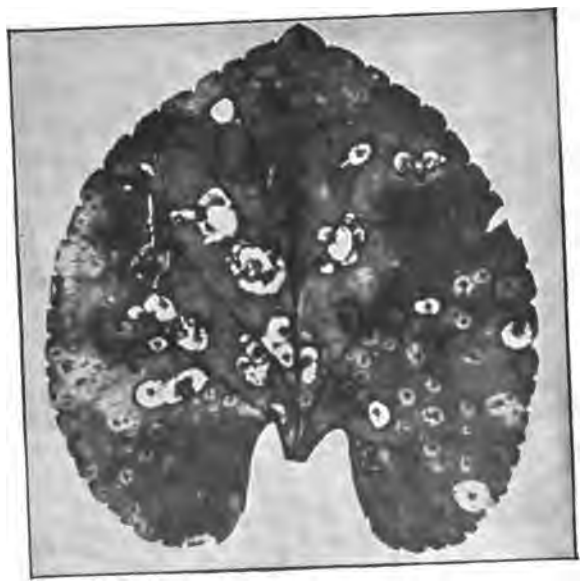

Fig. 3.

Fig. 4.

Fig. 5.

The change of color in the affected leaf is controlled somewhat by the color of the bloom. In the yellow varieties the foliage often turns to some shade of lemon, while purple is not infrequent in the pink sorts. The bacterial germs most likely enter the leaf through the stomates and, multiplying, spread from there.

This bacterial disease sickens the whole plant, and there is no fungous growth that breaks through the epidermis as in the rust, etc. Many other plants are liable to similar affections, the most widely known being the twig or fire blight of the pear, apple, and quince trees.

Fungous Diseases of the Violet. Passing from the carnation to the violet houses, we observe that health does not prevail. Some plants are stunted, others are yellow, while others still have the foliage blotched and spotted in various ways. It will be best for us to single out certain leaves and note the fungi that prey upon them.

The Violet Leaf Spot (*Cercospora Violæ* Sacc.), Figs 2 and 3, as the common name suggests, causes the foliage to become more or less covered with circular spots. There are several fungi causing the spotting of violet leaves, but the Cercospora can usually be detected by the dark centre of the spot due to the multitude of spore-bearing threads that are brown colored. Black moulds of various kinds often flourish upon the dead tissue of the spot and greatly change its appearance.

Another spotting of the violet leaves is caused by another fungus, namely, *Phyllosticta Violæ* Desm., Figs. 4 and 5, of a quite different type from the one above mentioned. By the naked eye, when carefully inspected the Phyllosticta spots are seen to have no dark central area, but scattered over the whole brown spot are minute dark specks in which the spores are borne. The Cercospora spot has the spores on minute aërial branches, but in the Phyllosticta Spot the spores are formed within flask-like bodies, and ooze out of the open neck when mature. Similar to the Phyllostica are a number of other violet parasites, as *Marsonia Violæ* Sacc. Besides these there are some fungi which cause blotching of the leaf and a general collapse of the whole plant. For example, there is an anthracnose (Glœosporium) of the violet similar to the one mentioned upon the rose. There is a bacterial trouble also, so that the violets are fully supplied with fungous parasites.

Fungous Diseases of Dracœnas. Some of the cultural varieties of Dracænas, notably the *Cordyline terminalis*, have failed to

preserve their health. The fungus *Phyllosticta maculicola* Hals., is recognized by producing small brown angular spots in the leaves, which finally show spore-bearing pimples.

There is a tip blight of *Draœcna fragrans* that often greatly disfigures the otherwise highly prized plants. "It is often the tips of leaves that are most subject to the bad effects of the blight, and this is true of many other than the Dracæna plants. This may be due to the fact that the water holds to the pendent tips longer than to any other portions. When the plants are sprinkled the upper portions of the foliage retaining only a film of the liquid quickly dry off, while the water descending to the tips remains there for a long time. The presence of this moisture upon the surface of the leaf-tips furnishes the proper conditions for the germination of spores that may have been brought there by the descending water as it flowed along, gathering to itself the spores previously deposited upon the surface of the leaf. It is thus seen that there are at least two good reasons why the tips of drooping leaves may be infested with fungi while the upright parts escape. As a matter of fact, however, such portions do not wholly escape. Not infrequently in the case in hand, the Dracæna leaves may be blighted midway of tips and base. In such instances it is possible that at some time there has been some injury by means of which the spores found an easy place to germinate, and their germ tubes to penetrate the leaf.

There is a third reason why the tips are more susceptible, namely, the greater surface exposed in proportion to the amount of tissues, than in the other parts of the leaf. The entrance of disease germs is largely a surface action, and therefore the chances are greater as the tip of the leaf is approached. The tips being thinner and farther from the base of interior water-supplies, often suffer from wilting, and become dried naturally. Anything of this nature assists the parasites to get a foothold. The wonder is that more tips are not attacked. When once a fungus has established itself, it will begin to work its way in the leaf toward its base. This advance may be quite uniform and rapid, so much so that there is a distinct line between the living and the destroyed tissue."*

Fungous Diseases of Palms. The growers of palms are far from exempt from troubles of a fungous nature. It is difficult to

*From the writer's Report from the New Jersey Experiment Station for 1893.

name the palms that are most affected, many of them becoming blotched more or less with one or another fungus. A tip blight is not uncommon. I have studied the Kentias more than any other palms and will speak particularly of them. If the dying of palm leaves was confined to the tip it might be concluded that the decay was due to the extreme susceptibility of the delicate end of the leaf to untoward influences, but it is not unusual to find circular spots in the body of the leaf that have the same associating fungus. The tips blight more frequently, possibly, because they are pendent and water collects and is retained there, giving the spores favorable conditions for germination. The fungus found in these blighted tips and elsewhere in the leaves is an anthracnose (*Colectotrichum Kentiæ* Hals.). It is a deep feeding parasite and causes the ruin of the plants or so disfigures them as to forbid their going to market.

Fungous Enemies in the Orchid House. The royal and fantastic family of orchids is not free from fungous enemies. The Sobralias, for example, are killed outright by an anthracnose (*Glœosporium cinctum* B. and C.) that works in the foliage. In like manner the large and tender leaves of the Bletias are preyed upon by several blights that greatly disfigure the plants. In many instances the pseudo-bulbs have large pits of decay due to one or more fungi. Occasionally the large and otherwise superb flowers of various orchids are spotted and blotched with brown which in some instances is due to micro-organisms. It is to be remembered that the tissue of the floral part is exceedingly delicate in structure, and also the colors are such that any disease is remarkably conspicuous. Sometimes the spotting consists of minute specks, in great numbers, scattered over the whole surface of the petal, and so uniform is this that one might almost conclude at first sight that it was characteristic of that particular species of flower. It is often true that the little specks will be bordered by a delicate ring of pink which will heighten the peculiar appearance of the blighted portion. There may be on the other hand only a single blighted patch, and this, by rapid increase, spreads throughout the whole orchid flower. When a petal is thus attacked it soon becomes worthless and falls down, either remaining attached by its base or drops away entirely. Such patches, upon examination with the compound microscope, reveal the presence of a fungous growth which is well known to the gardener as the gray mould. This gray mould (*Botrytis vulgaris*) is the most common to be met with

upon old blooms in greenhouses or other warm, moist places, and, abounding in spores which are borne upon the tips of slender threads, it keeps the atmosphere well stocked with germs, and these falling upon the delicate tissue of the orchid bloom will induce decay.

As a precautionary measure it goes without further saying that any and all old and worthless parts of greenhouse plants that are harboring this gray mould, or in fact any fungous growth, should be promptly removed from the place and consigned to the furnace. In this way a large portion of the decay of petals and other floral parts will be obviated.

Botrytis is able to gain a foothold within the vigorous leaves, particularly when some petal or other floral organ already infested with the gray mould falls upon the leaf and remains there. The fungus therein spreads from the petal to the leaf and shortly a blotch is formed upon the leaf, which continues to spread for some time, and possibly the decaying leaf in falling upon another will continue to spread the disease.

Fungous Diseases of Variegated Plants. Many of the indoor foliage plants are subject to blights of various sorts, but limited time will permit only a word under this head. It may be stated as a general principle that variegated foliage is more subject to attacks from fungi than the ordinary green leaves of plants of the same species. Thus the *Ficus elastica* var. *variegata*, while it may possess added attractions on account of the lack of chlorophyll, for the same reason is more susceptible to blights than the ordinary plants. Variegated Pelargoniums are apt to suffer from fungous attacks while the green leaved sorts go free. In like manner the day lilies, like the *Funkia undulata* var. *variegata*, are often worthless, and in such plants as the Aspidistras, where large white stripes run through the leaves, the fungi are much more apt to attack the etiolated parts. In short, gardeners are getting shy of variegated plants, because such have an evident tendency to blight.

Fungi of the Seed Bed. Passing now to the nursery department of the plant establishment, we find the seed bed is not exempt from fungous enemies. The leading trouble passes under the common name of "damping off," which is a general expression for a failure of the seedlings to maintain a stand. There may be many reasons for a failure at this point, but the chief one is the presence, in the tender tissue of the young sprouts, of microscopic

fungi of the genus Pythium, the *P. De Baryianum* Hesse., being the most common one. This fungus often attacks the plants with so much vigor as to sweep them off in a short time. In structure the Pythiums are quite similar to the mildews of the deeply seated type and are perhaps still more nearly related to the fungus causing a fatal rot of the round potato, the celebrated *Phytophthora infestans* De By.

Several other fungi may attack seedlings; in fact they are subject to the whole list of parasitic enemies that the host is subject to in its later life. The whole matter of seedlings and their relation to fungi is a theme in itself sufficient for the hour. Often the seed contains the fungus within itself, and as it germinates the parasite starts into activity, and ruins its subject. Again the germs are in the soil and pass from thence to the victim. It is not unusual for a fungus to spread from a central point in all directions through a seed bed, killing all plants as it goes.

Fungi of the Cutting Bench. Much of what has been said concerning the seed bed holds true of the cutting bench. Slips are portions of plants which are placed with one end in the moist sand, and have nearly the same conditions surrounding them as seedlings. They are subject to the attacks of "damping off" fungi coming from the soil, and in addition to this carry with them from the parent plant many hidden seeds of decay which under the new conditions may develop and ruin the slips. In the cutting bench therefore many fungi show themselves which are often only obscurely seen in the stock plants. Thus rose cuttings fail, because the stock has the Black Spot or the Anthracnose, the carnations damp off from the rampant growth of the Dark Stem-blight, and violets fail from the Leaf-spot fungus taking possession of the cuttings. Pelargoniums are stricken down with a blackening bacterial blight, and hosts of other sorts of cuttings fall under the influence of moulds of various sorts.

Remedies for Fungous Diseases. This paper upon Fungous Diseases would be incomplete from the standpoint of the floriculturist, without some words upon the subject of remedies. It is here that information is needed by everyone, and no one appreciates the lack more than those who desire to instruct. Naturally enough the diagnoses of the diseases have gone ahead of the remedial measures. It is the hope that in the near future more time will be given to the actual treatment of fungous troubles. Hospitals are

needed where sick plants may be cured, and thereby ways and means devised for the benefit of practical growers, who in turn will nurse their own ailing plants, or, better still, be able to foresee the enemy and avoid him. If one may be pardoned the expression, the best way to cure a plant is to preserve it in health.

The conditions which are provided for the best growth of greenhouse plants are those that favor the development of the fungous enemies. As a rule they thrive best with plenty of heat and moisture, therefore a greenhouse, other things remaining equal, will be the place where blights of all sorts may be expected. It is well known that the means of propagation is through the transfer of the fungus itself or its spores produced in countless numbers. The preventive measures are, first, to start new plants with healthy stock either from seed, or slips free from the disease; second, to prevent the germs of decay from entering the healthy plants, and third, if they are present to check their growth as much as possible.

Strong healthy seed is a very important starting point, the necessity of which is not always fully realized, but this is not the time to dwell upon this fact. In like manner cuttings should be from the best possible stock. If the seed and the slips were healthy, the only point necessary for continued vigor would consist in keeping out the germs, and surrounding the plants with the best conditions for growth. The latter the propagator is supposed to do. The germs enter from the soil or the air or both. Care should be exercised that the seed bed be germ free, and to this end the wood work of greenhouses needs to be fumigated and cleaned as frequently as possible. The soil is a ready receptacle for receiving spores and soon gets charged with them, therefore a frequent change of soil is important.

After everything has been done along sanitary lines for the good health of the plants, namely the use of healthy seed in healthful surroundings, there are some matters that still may need attention. Fungicides have their place in the greenhouse as well as in the orchard and garden. There are a few germ destroyers that when properly used have paid handsomely.

With roses, the mildew may be controlled by sulphur, either dusted on the foliage or heated upon the greenhouse pipes. The Black Spot has been materially checked by the Bordeaux Mixture and Cupram (Ammoniacal Solution of the Carbonate of Copper). In the Bordeaux Mixture, freshly slaked stone lime is combined with

sulphate of copper (blue stone) and applied as a thin wash with a spraying pump. The formula is five pounds each of the lime and sulphate of copper, to fifty gallons of water. The milk of lime may be made up and kept in stock to which the sulphate of copper, also kept in solution, may be added as desired for spraying.

The chief objection to the use of Bordeaux Mixture in the greenhouse is the bluish lime coating it gives to the plants. On this account Cupram is better. The formula for this latter is five ounces of carbonate of copper dissolved in three quarts of strong (4 F) ammonia, to be afterward added to fifty gallons of water. A convenient way to keep this compound is in the concentrated solution in a well corked bottle. Thus a bottle holding the three quarts of ammonia can receive the five ounces of copper and stand ready for use, it being necessary only to pour out an ounce for each gallon of water used for spraying.

These two fungicides are the chief ones that can be recommended for fungous troubles of the greenhouse. A solution of Potassic Sulphide, a half ounce to a gallon of water, has proved particularly beneficial with carnation diseases. This sulphide readily dissolves in water and is easily prepared and kept for use.

Good results have followed the use of the Bordeaux mixture for violet troubles, and many other plants grown under glass would doubtless be equally benefited by its use.

The work against injurious fungi must be preventive instead of curative, and the old saying that "an ounce of prevention is worth a pound of cure" is nowhere more applicable. It is often true that the enemy gets so far along with its destructive work that it is the part of wisdom to destroy the plants instead of trying to save them, much less propagate from them. Fungicides are most useful at the time of attack of the fungus and, therefore, often need to be used before the parasite shows itself. It is most likely that greenhouse plants generally would profit by a spraying now and then, and a more general use of fungicides is to be looked for by growers of ornamental plants.

The man who keeps his plants in the best way, observing the proper conditions of seed bed, soil, air, and food supply, the one who has all things neat and clean, will also be the one who sprays. He will not delay until the plants are sick through and through, but will use the fungicide as a shield for plants while healthy. Such an one will have the greatest pleasure in his plants and be most largely rewarded by them for his watchful care.

DISCUSSION.

W. D. Philbrick asked whether Professor Halsted had ever used extremely diluted Sulphate of Copper,—one ounce of the sulphate to one hundred gallons of water?

Professor Halsted answered that he had no doubt that the proportions named would be useful in many cases. He said that fungicides were frequently used too strong, as experimenters found to their cost. He had an acre of plants on which to experiment. In his trials upon beans he used Bordeaux Mixture of three degrees of strength. The full strength kept off the fungi, and the leaves retained a good color, but the plants were stunted in growth, attaining no more than half the usual size of the variety. With the strength reduced one-half, the good effects were quite as evident, but the dwarfing was still considerable. Reduced to one-quarter of standard strength, the mixture thoroughly protected the plants from fungous injury, but still prevented full development. This trial showed conclusively that fungicides are generally used too strong; next year still weaker solutions will be tried. Fungous spores will not germinate in water in which even a small quantity of copper filings have been kept, and this without any sulphuric acid, or any other corroding agent, than the supposed pure water contained. The greatest success with fungicides is secured when they are put in the right place at the right time.

Charles J. Dawson inquired what should be done to prevent "damping off" in the seed pan.

Professor Halsted replied that while the question is an important one, the attention of the station officers had not been so specially called to it as to many others, and therefore but little is as yet known about it. He did not see why the soil should not be sprayed as well as plants; nor why hot water could not be used — not so hot as to endanger the plants, but sufficiently so to kill the fungous threads, which cannot endure a very warm bath. He knew that young ferns had been so treated successfully. He suggested that possibly Bordeaux Mixture, if sufficiently reduced in strength, might prove more advantageous.

Jackson Dawson said he had tried some chemicals but was more successful with quite hot sand. Still, he thought seedlings could be saved quite as well by washing out the soil in which they were started, and pricking them out in purified soil.

Kenneth Finlayson desired to learn how it was that rusts attained such headway before their presence was detected.

Professor Halsted said in reply that the rusts develop within the plants they attack, and usually go all through before producing any spores. The spores are then produced upon the surface, but the host plant is already ruined. However, spraying the whole body of plants, as soon as the rust appears, may prevent the spread of the disease through the crop, by destroying the spores before they are distributed from the first diseased plant. Many fungous diseases are somewhat local and can be readily removed, but rusts are deep-seated. Spraying at short intervals is the best preventive of the spread of most fungous diseases.

Charles J. Dawson had noticed a kind of rot upon the stems of some plants, and asked if such blemishes were caused by fungi.

Professor Halsted in reply stated that bacterial diseases attacked the crowns of violets, and probably some species begin their destructive work upon the stems of other plants.

BUSINESS MEETING.

SATURDAY, February 2, 1895.

An adjourned meeting of the Society was holden at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair.

Charles E. Richardson read his annual report as Treasurer and Superintendent of the Building, which was accepted and referred to the Committee on Publication.

Henry L. Clapp, from the Committee on School Gardens and Children's Herbariums, read a supplementary report, giving an account of the Garden connected with the Robert G. Shaw School, by W. E. C. Rich, Principal. This report was accepted and referred to the Committee on Publication.

Edmund Hersey, Chairman of the Committee on Large, Old, or Otherwise Interesting Trees in New England, read a report from that Committee, and also presented a bound volume of photographs and descriptions of such trees, prepared by the Committee. On motion of William C. Strong the report and the book were

accepted, and it was voted that the Committee remain in office, and be requested to continue their work on the subject.

The President appointed William P. Rich a member of the Committee on School Gardens and Children's Herbariums, in place of T. Otis Fuller, who had declined to serve.

The President also announced the Committee provided for at the last meeting of the Society, to consider the expediency of placing the property of the Society in the hands of a Board of Trustees, as follows: William C. Strong, William H. Spooner, and Walter Hunnewell.

The following named persons, having been recommended by the Executive Committee as members of the Society, were, on ballot, duly elected:

DR. DANIEL D. LEE, of Boston.
JOHN C. HASKELL, of Lynn.
FRED. W. FLETCHER, of Auburndale.
MRS. CLARA E. SEARS, of Boston.
HON. CHARLES W. HOITT, of Nashua, N. H.
HARRY BURNETT, of Southborough.

Adjourned to Saturday, March 2.

MEETING FOR LECTURE AND DISCUSSION.

The following paper was read by the author:

HARDY PLANTS AND SHRUBS AND THEIR ARRANGEMENT.

BY J. WILKINSON ELLIOTT, Landscape Architect, Pittsburg, Pa.

It must be remembered that my experience has been with a more western civilization, and some of my remarks may not have much force addressed to so enlightened a gardening community as that of Boston and its suburbs. Yet I am told there are some people in this neighborhood who persist, and at considerable outlay and trouble, in using thousands of tender bedding plants to make poor representations of inanimate objects. If this is true they cannot make the plea of not knowing better, for all about them are many of the best and most tasteful gardens in America — splendid examples of garden schemes in which the so-called bedding plants cut little or no figure.

There has been so much written and said on the subject, and the great advantages of gardening with hardy plants and shrubs are so apparent, as compared with tender bedding plants, that it seems a waste of time and words to make any argument in favor of one and against the other, but the argument is needed as much as ever, for it is an undeniable fact that nine-tenths of the ornamental gardening in America is still done with a few commonplace and uninteresting bedding plants. Think of the pity of it, that all this enormous annual expenditure should be wasted — an expenditure that leaves our gardens in the fall exactly as it found them in the spring, bare earth and nothing in it.

Is it because the people prefer bedding plants to hardy ones? You who know hardy plants know that this is not so. Who would prefer, let us say, a bed of coleuses or geraniums to a fine group of rhododendrons, or azaleas, or Auratum lilies, or Japanese anemones, or to the hundreds of fine things to be had in hardy shrubs and plants? Any one of these has a beauty incomparably greater than can be produced with the most lavish use of bedding plants. Then the bedding plants are a yearly expense, while an investment in hardy plants and shrubs returns the investor an annual dividend in increased size and loveliness. Every dollar spent for them secures a permanent addition to the garden, and the time soon comes when the annual outlay can be devoted entirely to care and culture.

I know a gentleman who carried a fine stalk of Auratum lily flowers into the office of one of the largest business houses in our city. Not a man in the office knew what it was, and all were unwilling to believe that it grew in his garden. They supposed it to be some rare and costly flower grown in a conservatory. Yet Auratum lilies and dozens of other things as fine can now be bought as cheaply as bedding plants.

The people do not prefer bedding plants to hardy ones. They have no choice in the matter. They buy what the local florist offers and what they see in their neighbors' gardens. They are not sufficiently interested to make inquiries. They do not read the gardening papers, and with few exceptions the managers of the city parks, who should be such educators of the people in gardening, are content with what might be called an annual pyrotechnical display of bedding plants as it is of such short duration and little artistic value.

The popularity of bedding plants is happily on the wane; it occurs to almost everybody after a time that they do not get much for their money when they buy this sort of material, but I cannot say that hardy plants are gaining much. There is no considerable effort made to attract the public attention to their merits, and when some man, more enterprising than his neighbors, does take the trouble to hunt them up and do his gardening with them the result is not always happy. He is very apt to use them as he would bedding plants — that is, in formal beds cut out of the grass of the lawn. Of course hardy plants do not lend themselves to this treatment, and it is one of their greatest merits that they do not. Better no flowers at all than that the lawn should be cut up in formal beds for their accommodation.

An objection often urged against hardy plants is their short duration of bloom, but this really is one of their greatest merits. Let us consider the garden that depends exclusively upon bedding plants for its decoration. It is usually the first of June before they can be planted, and it is well into July before they are effective, and often by the end of September they are killed by frost, and every day during their short season of three months they are as unchanging in appearance as the carpets in our houses and about as interesting.

On the contrary, the well planned and well planted garden of hardy plants begins its season with earliest spring and terminates it not with the first light frosts of fall but when November brings some real winter weather, and then only goes to rest to delight us afresh with the coming of another spring. Almost every day throughout its long season the hardy garden is changing with the changes of the season, something new is coming into bloom, and before it becomes monotonous its season is over and its place taken by some other flower equally beautiful and interesting but entirely different. Our garden is never tiresome, its past is a pleasant memory, its future a delightful anticipation, and its bloom an accurate calendar of the seasons. Is this true or only fanciful writing? It is true, every word of it — hard but pleasant facts.

Snowdrops are in bloom with the first pleasant weather in spring; last spring they were in bloom during the first week in March. They are quickly followed by scillas and crocuses, and then comes the season of tulips and narcissuses, with their count-

less varieties. What a variety of form in the narcissuses! What a wealth of colors in the tulips! Their season is fully a month, and before it is done the early flowering herbaceous plants are showing bloom, and the flowering shrubs have begun a display that will end only with fall. By May scores of hardy shrubs and plants are in bloom — creeping Phloxes, Columbines, Doronicums, Oriental Poppies, German and Siberian Irises, and in shrubs, Lilacs, early Spiræas, Japan Quinces, Magnolias, and Mollis and Ghent Azaleas, and we must not forget the hardy climbers, of which the Clematis, in its numerous splendid varieties, covers a season of fully six months and with which alone a most charming and interesting garden could be made. June brings such a wealth of bloom that we are at a loss as to what to use and what to reject. Rhododendrons in many varieties and colors, Kalmias, Candidum and Elegans Lilies, and hardy Roses are the flowers, perhaps, that hold the greatest share of our admiration at this season, and if June gave us hardy roses alone, our garden should be satisfactory. The memory of a fine collection of hardy roses in full bloom is worth more than all the ribbon and carpet beds ever devised, and and in saying this, it is with full knowledge of the much advertised rolls of carpet, vases, worlds of flowers, etc., with which South Park delights the citizens of Chicago.

I fear that much of the benefit of the example of Mr. Olmsted's and Mr. Codman's work at the World's Fair was lost. It was so well done and so naturally done that a majority of the visitors never suspected that a landscape gardener had been employed.

After the glorious beauty of June we might be content to have our garden tame for a month or two. But there is no need for tameness. At the beginning of July the magnificent Japanese Irises are in bloom, than which there is nothing finer. Wealthy men build and maintain glass houses at great expense to shelter things not half so fine. After the Irises come the Japanese Lilies, and with a little management these will give a brave show of bloom throughout the summer and fall until frost comes. To carry us through the summer we have also tall Phloxes, Yuccas, Rudbeckias, Gaillardias, Tiger Lilies, Hollyhocks — single and double — Campanulas, Rugosa Roses, Day Lilies, Althæas, Hydrangeas, Tamarix, hardy Sunflowers, and a host of other good things that the time at our disposal will not permit us to consider. That is one trouble with a paper on hardy plants and shrubs; a

list of the desirable varieties would make a long article and that without any comment.

And when fall comes we have still some of the best flowers in reserve, notably the Japanese Anemones and the old-fashioned and really hardy Chrysanthemums. The flowers of both these good things will endure the early frosts and early snowstorms and delight us with a show of bloom on such sunshiny days as we may be favored with in late fall.

It may be thought that to win my admiration a flower must be hardy. Nothing of the sort. Certainly the basis of all good outdoor gardening must be hardy material, but the skillful gardener or amateur will find a place for many tender plants, and especially for the so-called summer-blooming bulbs, such as Gladioluses, Dahlias, and Tuberous Begonias, all of which are easily wintered in any dwelling house, and he will even find a place for the new large flowering Cannas, but that place is not in isolated beds on the lawn. I have seen them used to the best advantage in small groups in the margin of a shrubbery where the full benefit of their really fine coloring was gotten, but their stiffness and ungracefulness concealed. And the many fine annuals which are so cheaply and easily raised from seeds are not to be overlooked—*Phlox Drummondii*, Sweet Peas, Asters, Calliopsis, are all fine, and I am free to confess that there are but few things among hardy plants that I admire more than a fine mass of tall Nasturtiums.

The most important thing we have to consider in connection with gardening hardy plants and shrubs is their arrangement. We must study to produce a pleasing effect at all seasons and to have a succession of bloom so that the garden will never be dull or uninteresting. First, let us take the smallest garden that we can hope to make a gardening success with, that is, a fifty foot city or suburban lot. This is a lot usually considered too small to do much with in a gardening way, yet it is the lot owned by thousands of well-to-do and cultivated people, and well worthy of consideration. I can best illustrate a good arrangement for such a lot by describing a garden in my neighborhood. The lot is fifty feet front and one hundred and twenty feet deep to an alley. A path leads from the sidewalk to the steps of the front porch; thence around the west side of the house to the steps of the kitchen porch, and thence straight out to the alley.

The house is thirty feet from the street line. The owner of the lot believes with me that every garden should be enclosed, and has selected as the most desirable enclosure a hedge of California privet, which furnishes him a background of verdure to set his flowering plants against. He has had some difficulty in establishing a portion of the hedge immediately between his house and those of his neighbors, on account of the shade, but has overcome it by extra culture, and deep trenching and draining. The plan of his extremely simple but effective garden is as follows: a border has been made entirely around the house except at the entrances, varying from one to three feet in width. The front porch is covered with Halleana and Golden Honeysuckles, *Clematis Jackmanni*, *C. Henryi*, and *C. paniculata*. The borders in front of the porch are planted with *Eulalia gracillima*, Erianthus, *Funkia Sieboldiana* and *F. subcordata* — the Funkias in front of the Eulalia and Erianthus. As all these plants are grown for form and foliage they are effective throughout the season. A group of Tuberous Begonias is also introduced in this border, and of course has to be planted every season. The border on the east side of the house is quite shaded, and consequently is planted with shade-loving plants, principally native Ferns, with groups of native Cypripediums, Trilliums, Lilies-of-the-valley, Tiarellas, and a large group of Lancifolium lilies at the end of the border where there is the most light. The garden back of the house is almost fifty feet square, but one side is perhaps sixty feet on account of the shape of the house. This garden is completely enclosed by a border, except where it is broken by the necessary path. This border, commences west of the kitchen porch steps, and follows the line of the house until it reaches the division between the front and back garden; it then crosses to the hedge, which it follows, so that there is a flower border in front of all the hedge back of the line of the house. This border is five feet wide except on the west side of the lot, where the entire space, about seven feet, is taken up, except a narrow border of grass between the shrubs and the walk. This space is planted with fifty hardy roses, mostly Hybrid Perpetuals, in thirty of the best varieties. In front of these roses is planted a narrow border, about ten inches wide, of various narcissi; among the roses, gladioli are planted every spring. The remainder of the border is planted with herbaceous plants in groups, with a selection that secures a

succession of bloom. This selection includes Columbines, Japanese Anemones, Irises, Lilies, Pæonies, German Irises, *Helianthus lætiflorus*, *Coreopsis lanceolata*, Gaillardias, *Rudbeckia hirta*, hardy Asters, Campanulas, Phloxes, Delphiniums, and *Heuchera sanguinea*. In front of these is a narrow border of Tulips, Narcissuses, Millas, etc., which is carpeted with *Phlox subulata*. Room is also found for some Sweet Peas, *Phlox Drummondii*, and Nasturtiums.

The kitchen porch is covered with Honeysuckles and Clematis and the brick wall of the house with *Ampelopsis Veitchii*. At one corner of the house is planted a Chinese Wistaria which is trained upon a single wire to the top of the house and then along the eaves. The necessary but usually unsightly posts for the clothes line, are converted into a charming feature of the garden in this way. For the posts, locust saplings about eight inches in diameter with the branches shortened back to five or six feet have been used. These are covered with Halleana honeysuckle, Trumpet creeper, and *Clematis paniculata*, one over each of three posts; and Golden honeysuckle and *Clematis Jackmanni* together on the other. As the space for flowering shrubs is extremely limited only the choicest are used — a *Magnolia stellata* and a Red-Leaved Japanese maple in the front garden, and a *Magnolia Soulangeana*, a *Magnolia conspicua*, and a Japanese Snowball in the back garden. The magnolias will in time become too large for the garden but it will be many years, and the owner is content, for the sake of their great beauty, to cut them out and replace them with smaller ones when he must.

In addition to all this planting, the lawn is filled with Crocuses, Scillas, and Snowdrops, a very pleasing way of using them.

This garden is the most effective, beautiful, and interesting in the neighborhood, yet is made on a lot usually considered too small to have gardening possibilities. It cost more than most gardens of this size but it is complete; nothing more need be bought; on the contrary the overflow of the natural increase is brightening the gardens of neighbors and friends. This garden has also privacy, which I hold is as desirable in a garden as it is in the living rooms of the house.

Suburban lots of one hundred and fifty feet frontage, and from that to an acre or two acres in extent are popular sizes in this country. Such lots admit of a combination border made with

hardy shrubs and plants — one of the most attractive ways in which they can be used. Such a border will vary of course in size, shape, and formation, with the requirements of individual places and must be designed to suit them, but let us suppose a lot of one hundred and fifty feet frontage, and two hundred feet depth, with an eastern exposure. The house is placed midway in the lot and only far enough away from the northern boundary to permit of a screen of planting. It is common to place the house as nearly in the centre of the lot as possible, but a mistake, for such a location reduces the size of the lawn and the gardening possibilities greatly. We would occupy the entire southern and western boundaries of the lot, and perhaps a portion of the eastern, with the border, which should vary in width from five or six feet up to twenty feet, with a curved outline on the lawn. This border should be planted principally with shrubs arranged in groups, but a few trees such as Birches, Magnolias, and Judas trees should be used, and a few evergreens, such as Retinosporas and quite a number of evergreen shrubs. Where a great variety of hardy plants is desired the entire margin of this border might be filled with them, but a more effective arrangement is to plant them in bold groups, one variety in a group, and alternating them with groups of shrubs. Some of the stronger growing plants such as Sunflowers, Foxgloves, and single Hollyhocks might be placed in the middle or back part of the border, and the Japanese lilies,— Auratum, Rubrum, and Album,— and our American species, Superbum, can always be planted in, and combined to advantage with, groups of rhododendrons and azaleas. After such a border is completely planted with shrubs and hardy plants there will be many opportunities for introducing colonies of spring flowering bulbs,— Tulips, Narcissuses, etc.— and the advantage of using bulbs in this way is that the planting is permanent and they are really more effective than in formal shaped beds cut out of the lawn. It is the intention to keep this border in a cultivated condition, free from weeds and grass, and to give an annual mulching of manure. A lot of this size, planted so densely on its boundary, should have its lawn kept quite free and open and have only a few choice specimens planted on it and no large trees, except street trees on the edge of the sidewalk.

I do not claim that this is the most artistic arrangement that can be made for a small suburban place. I have in mind a most

artistic place that is almost enclosed by a quite narrow planting of ordinary trees and shrubs, with a mass of trees back of the house and a single magnificent specimen tree on the front lawn. This is a satisfactory arrangement, as an example of fine architecture is satisfactory, but all the variety, interest, and pleasure of gardening is lost.

In larger grounds, where a vegetable garden and perhaps an orchard are features, the opportunities for using hardy shrubs and plants are much greater and more varied. The vegetable garden may be made the most interesting and delightful place imaginable. Usually it is simply a field of vegetables fully exposed from all points of the ground and very often unsightly. Now the vegetable garden should be concealed from the lawn and house, and this necessity at once suggests a border, or boundary planting, of shrubs and herbaceous plants as described for the smaller suburban lot. This planting should not only hide the garden but should hide its outlines, which are usually rectangular. The garden itself should be enclosed with a hedge, which should show from the inside of the garden but never from the lawn. California privet makes a very satisfactory garden hedge, but where that is not hardy, hemlock spruce can be used. Nothing makes a finer hedge than this, but it is slower growing than the privet, of which I have seen a perfect hedge five feet high made in three seasons, starting with two year old plants. A convenient walk from the house should pass through the shrubbery into the garden, and of course a convenient entrance will be made for bringing in manure, etc. A walk should be laid out all around the garden five to six feet wide, with a border for flowers six feet wide between the walk and the hedge. There should be also two walks six feet wide crossing each other at right angles and dividing the garden into four rectangular pieces of about equal size. On both sides of these walks, Grapes, dwarf Pears, and small fruits can be planted and also on the inner sides of the outer walk, if desired. The walks can be made of any material that is convenient, and need not be expensive. In one garden that I know, they are made of grass and kept as a lawn would be. I know that there are objections that can be urged against grass walks, but the owner of the garden in question does not find them objectionable, and they are certainly more pleasing to the eye than gravel walks. The border between the walk and the hedge should be given up

entirely to flowers; hardy plants should predominate, but there should be liberal spaces reserved for summer-blooming bulbs and annuals. In the hardy plants each variety should be grouped and as many sorts used as thought desirable, but in making a selection flowers suitable for cutting as well as for making a garden effect should be preferred. Such bold and striking plants as single Hollyhocks and Foxgloves should be planted in decided masses, and a border with eastern or southern exposure should be used for hybrid perpetual Roses.

A vegetable garden, arranged as described and properly cared for, in addition to being an interesting and pleasant place to visit, would furnish an abundant supply of cut flowers for the house, for the church, for the hospital, and for friends, and I think one of the keenest pleasures a garden can afford is the ability to give away flowers without stint, and the garden of hardy flowers enables one to give away plants as well as flowers, for the natural increase soon makes a surplus.

In large grounds there are often opportunities for using hardy plants and shrubs in a freer and more picturesque way than any I have suggested; that is, the planting of them in groups and masses to produce the same effects as if they were growing wild. Indeed, after the first careful planting, they should be allowed to grow wild without culture and uncontrolled. The naturalizing of hardy material does not mean that we should attempt to imitate the thickets, woods, or meadows, on our lawns. It does mean the taking advantage of a brookside for groups and colonies of Irises, Narcissuses, hardy Ferns, the splendid Superbum lilies, and the scores of beautiful things that will thrive in the grass if it is not to be cut with the lawn mower. It means the planting an irregular group of Foxgloves on the edge of a wood, or the covering a rough bank with a mass of Kalmias or native Azaleas or native Rhododendrons or with all of these shrubs together. It means the increasing the beauty and interest of the wild and rough parts of a place an hundred-fold, but considerable taste and knowledge of materials are needed to produce good results.

We must not overlook the claims of climbing shrubs and plants to our consideration. No gardening scheme, large or small, should ignore them. We can imagine a most delightful garden where they, in connection with trees and shrubbery, alone are used; and, if we consider their decorative effect, foliage, gracefulness of

growth, and the great beauty of flowers that many of them have, we must admit they are entitled to a more important place in our gardens. The free use of the Clematis family alone would give a thousand-fold more beauty than is obtainable with the most lavish use of bedding plants, and here we not only consider the large flowered type but the smaller flowered sorts as well, with their luxuriance of growth and their charming effect, when used as tree, shrub, hedge, or fence drapery. And then the Climbing Roses — what a glorious possibility here, with their showers of bloom in June.

Climbers will not exhibit their best charms if trained in a stiff and formal manner; they must, in whatever position used, be allowed to grow untrammeled. My neighbor's garden furnished a good illustration of this. He planted common Morning Glories all about his porch, with the intention of training them on strings later, but he was diverted from his intention and the Morning Glories were allowed to grow as they would. The effect was most charming; they clambered over every shrub they could reach, shared a trellis with a Clematis, and, where they could find nothing to climb on, formed mounds of green of the most tangled and pleasing description. Morning Glories, common as they are, if used rightly, produce the most delightful effects. One of the right ways is to sow them among tall grass, or among low bushes and shrubbery, and as they renew themselves annually from seed they may properly be considered hardy. As a rule vines should not be trained in a formal manner. If you would have them exhibit their best graces they must be allowed to grow uncontrolled. All know the uses that vines are commonly put to — that of covering the walls of the house, furnishing shade for porch or arbor, and the covering of screens and trellises. Besides these, almost every place of any size offers opportunities for their growth in a freer and more natural way that will greatly add to the charm and delight of the garden. Perhaps a neglected shrubbery, unsightly in itself, will afford support for such easily grown things as Honeysuckles, *Clematis Virginiana*, and *C. Flammula*, or the common wild Morning Glory, so plentiful in many places, would be quite at home here. An unsightly fence might be partly concealed and made a thing of beauty with Climbing Roses, Honeysuckles, or Clematises, or an old tree, past its prime and beginning to be unsightly, would be the very thing on which to grow such vigorous

vines as the Aristolochia, Wistaria, Trumpet vine, and the common Virginia creeper. In how many places are seen evergreens in a half dead condition, which only procrastination has spared from the axe, and as unsightly as could well be; but nothing could be better on which to grow the Large-Flowered Clematis, which furnishes a profusion of lovely bloom that no words can describe. Some vines, like the Golden Honeysuckle, planted in the grass, will pile themselves up in masses, and if any shrub is within reach will finally clamber over it, producing an effect entirely pleasing. There is nothing more charming in Nature than the combination of shrub or tree with wild vines. Who has not seen the living canopy of green formed by the wild grape over the top of some tree or the stronger growing shrubs, or how some wild vine converts a thicket of brambles, and an old fence into objects of beauty that the most ambitious gardener might copy?

It is not possible in a paper of this length even to name all of the desirable hardy shrubs and plants now obtainable, but I think it is well to give a list of what I would commend as the very best, taking into consideration their ease of culture, as well as the beauty of their bloom, form, and foliage. I know many would disagree with me as to the contents of this list, but I am confident that the beginner could make no mistake in including any or all of the varieties named in this planting list. I have tried to name these plants and shrubs somewhat in the order they hold in my esteem, but this is a difficult matter, as I am very apt to think the finest thing to be the last fine thing that I have seen.

List of Plants.

Hybrid Perpetual Roses in variety including
Paul Neyron,
Ulrich Brunner,
Mme. Gabriel Luizet,
General Jacqueminot,
Anna de Diesbach,
Magna Charta,
Baroness Rothschild,
Captain Christy, and
Mabel Morrison,
Anemone Japonica alba,
Single Hollyhocks,
Japanese Irises,
Lilium auratum,
Rudbeckia hirta,
Aquilegias in variety,
Yucca filamentosa,
Herbaceous Pæonies — single and double, in variety,
Lilium speciosum,
Helianthus lætiflorus,
Foxgloves,
Tall Perennial Phloxes in variety,

Delphiniums in variety,
German Irises,
Aster Novæ-Angliæ roseus,
Chrysanthemums—old-fashioned hardy sorts,
Iberis sempervirens,
Lilium superbum,
" *Canadense*,
Phlox subulata and the variety *alba*,
Pyrethrum uliginosum,
Sedum spectabile,
Doronicum plantagineum excelsum,
Gaillardias,
Oriental Poppies,
Tree Pæonies,
Eulalia gracillima,
Funkia Sieboldiana,
" *subcordata*,
Arundo donax,
Hibiscus Moscheutos,
Heuchera sanguinea,
Pyrethrum roseum—single and double varieties,
Spiræa palmata,
" *Filipendula*,
Tiarella cordifolia,
Myosotis palustris semperflorens,
Helianthus rigidum,
Campanula turbinata,
" *Mariesii*,
Viola cornuta,
Cypripedium spectabile,
Native Ferns in variety.

Spring Flowering Bulbs.

Narcissus bicolor,
" Horsfieldii,
" Poet's,
" Emperor,
" Van Sion,
" albus plenus odoratus,
" Golden Spur,
" Trumpet Major,
Tulips—early-flowering single,
" Gesneriana—late-flowering single,
Milla uniflora,
Crocuses in variety,
Scilla sibirica,
Single Snowdrops.

Climbers.

Clematis paniculata,
" *Henryi*,
Ampelopsis Veitchii,
Lonicera Halleana,
Clematis Jackmanni,
Purple Chinese Wistaria,
Clematis Virginiana,
" *Flammula*,
Trumpet Creeper,
Golden Japan Honeysuckle.

Shrubs.

Kalmia latifolia,
Rhododendrons (Catawbiense hybrids),
Azalea calendulacea,
" *arborescens*,
Spiræa Van Houttei,

Weigela candida,
Magnolia stellata,
Ghent and Mollis azaleas,
Japan maples in three varieties—
sanguineum, *aureum*, and *atropurpureum dissectum*,
Hydrangea paniculata grandiflora,
Japan Snowball,
Cornus Spathii,
" *sanguinea elegantissima*,
Lilacs in variety,
Tamarix tetrandra,
" *Chinensis*,
Berberis Thunbergii,
Forsythia suspensa,
Exorchorda grandiflora,
Desmodium penduliflorum,
Spiræa Lindleyana,
" *Reevesiana*,
" *Reevesiana fl. pl.*,
" Anthony Waterer,
" *Bumalda*,
" *Thunbergii*,
" *prunifolia fl. pl.*,
Rosa rugosa,
Althæas, Dwarf Single White, Buist's Variegated, and Double varieties,
Japan Quince,
Deutzia crenata fl. pl.,
" *gracilis*,
Hydrangea paniculata,
" *quercifolia*,
Philadelphus coronarius,
Weigela rosea,
" *rosea nana variegata*,
Forsythia Fortunei,
Golden Elder,
Rhododendron maximum,
Andromeda Japonica,
" *floribunda*,
Eleagnus longipes,
Snowberries, white and red,
Prunus Pissardi,
Hypericum aureum,
Ligustrum Ibota,
Upright Honeysuckles.

I have placed hardy roses at the head of the list of plants although they are really shrubs, but they belong in the flower garden and not in the shrubbery. None will dispute their right to the place of honor, but notwithstanding the universal admiration that is expressed for them, they are grown in but comparatively few gardens. It requires considerable effort to have them in perfection, but the results amply reward the labor. I cannot go into cultural directions, but I wish to say, and with considerable emphasis, that in my experience in growing roses, which has been as an amateur, I have found roses on their own roots much more satisfactory than budded plants.

I know that Japanese Irises and a dozen other herbaceous plants have as strong claims perhaps for consideration as the white Japanese Anemone, which has my unqualified admiration. It has

so many good qualities — individual beauty of flowers; great effectiveness in the garden, shrubbery, or border; good foliage at all seasons; a long season of bloom, and flowers that will endure a degree of frost that destroys almost everything else. Its only limitation is that it will not thrive in light sandy soil, but in a heavy, rich soil it grows with great vigor. I have often seen it five feet high and that too in places where it had been naturalized and received no attention after planting.

Why is it that single Hollyhocks are not offered for sale or grown by nurserymen and plantsmen? Surely they are the most stately, picturesque, and decorative herbaceous plants in cultivation, and I have never met anybody who did not greatly admire them, but as far as I know they cannot be bought — not even the seed. The single sorts were always very much finer than the highly cultivated double sorts, whose culture has been made difficult of late on account of the hollyhock disease. On the contrary the single varieties are of the easiest culture, and once established will take care of themselves in almost any location.

Equally neglected are the old-fashioned and really hardy Chrysanthemums, which are still to be found in an occasional garden. I know these chrysanthemums would cut but a poor figure in the exhibitions and florists' windows, but they have far more gardening value than all the hundreds of new varieties introduced in the last few years, which can only be grown in perfection by the skillful florist or by the amateur who has all the facilities of the florist.

The numerous fine exhibitions of chrysanthemums every fall are very enjoyable but I fail to see that they have helped gardening any, except that of a very limited class. On the contrary, outdoor gardening has been retarded by the disappointment of thousands of people who have tried to grow the exhibition pets in their gardens.

In a recent number of "Garden and Forest," Mr. Gerard has very properly called attention to the possible field for the hybridizer in improving really hardy chrysanthemums for garden purposes, and in a later number a writer takes exceptions to his remarks, claiming that the flowers are always damaged by frost and that their habit is straggling and poor as compared with the improved greenhouse varieties.

Now, I think we have all seen chrysanthemums in farmhouse yards and village gardens that have endured for years, and that

have, without any special culture, produced an annual mass of very satisfactory flowers and foliage, and there is no doubt that the flowers of these sorts will go through considerable frost and snow without tarnishing.

These chrysanthemums are certainly useful material for the hybridizer, but for the present we shall be very well satisfied if some enterprising nurserymen will collect from old gardens such varieties as now exist and give us the opportunity of using them in our gardens.

Before I conclude I wish to give aspecial word of praise to my favorite shrub, *Kalmia latifolia*, which is known in Pennsylvania, where it is very common in the woods, as the small-leaved mountain laurel. It is greatly admired as a wild flower, and an occasional unsuccessful attempt is made to transplant it from the woods, but nurserymen have made no attempt to introduce it into general culture, and it is somewhat curious that it is necessary to send to England to get fine specimens of this distinctively American plant. Excepting odor, it has every good quality that a shrub can have — evergreen foliage and good habit, great quantity of durable bloom, extreme daintiness and beauty of individual flowers, and usefulness as cut flowers. If the flowers are cut just as the buds are about to open and placed in water they will last for two weeks in the house, and if arranged with taste nothing is more decorative.

In one of his books Donald G. Mitchell suggests that the Kalmia would probably make an excellent hedge. I have never seen it tried but I am confident that it would — perhaps as fine as the holly hedges in England, and, with a little discretion in trimming, a hedge of it could be made to produce a fine crop of bloom at least every other season.

With nursery-grown plants to start with, the Kalmia is of the easiest culture, requiring no special soil or location, and it is perfectly hardy. Like all evergreen shrubs it should be transplanted in the spring.

All the hardy plants I have named, with two or three exceptions, will thrive with ordinary garden culture, and some of them without any attention after planting, but as they are usually planted where they are to remain for years it would be well to make the initial preparation of the soil for them a liberal one. I usually specify that borders for hardy plants should have two feet of good friable

soil mixed with one-fourth its bulk of rotted stable manure, and that they should be prepared in late summer or fall, and the planting done the following spring. Fall planting of hardy plants is often recommended, but my experience is that many plants are winter-killed after fall planting that are quite hardy after having the benefit of a growing season to establish themselves. Of course special plants require special treatment; for instance, the bulbs of the Auratum lilies should not come in direct contact with manure, and the fine double and single varieties of *Pyrethrum roseum* should be planted in beds raised a few inches, to prevent their rotting out in cold, wet weather.

I would advise the same liberal preparation of the soil for shrubs that I do for hardy plants, though in many instances the expense would be prohibitory or thought so, but in any event I should insist on the ground being subsoiled or trenched and a liberal application of stable manure being made. An annual mulching of manure is beneficial to both shrubs and hardy plants.

I have had a somewhat extended experience with Rhododendrons, and my opinion of the proper soil to grow them in may be worth something. Their beauty is now pretty generally known and appreciated, but they are popularly considered tender and difficult to grow. This is largely owing to the selling of improperly grown plants and tender varieties, and to late fall planting, which is very apt to be fatal. I have found that when Catawbiense seedlings, or the well-known hardy named varieties, grown on their own roots from layers, were planted, there was no difficulty in growing them in any ordinary soil or in any position except immediately under old established trees. I have seen them grown with peat and with leaf mould, but the best results I have ever seen in this country were where an excavation two and one-half feet deep had been made for them and filled in entirely with turfy, fibrous sods, chopped up, and allowed to stand over winter before planting. No manure was mixed with the sods, but after the rhododendrons were planted a mulching of rotted cow manure was applied to the surface of the soil.

It seems to me I have said a great deal about the merit of hardy plants and shrubs, and but very little about their culture, but it must be remembered that my mind is more occupied with the designing of gardens than with their care, and I think it is quite

as important to create an interest in hardy material as it is to teach how to grow it. Cultural skill will soon follow enthusiastic desire, which your Society is doing so much to create, and when we can have horticultural societies of like intelligence and breadth of object in all our large cities the advancement of the best gardening will be rapid.

DISCUSSION.

In reply to a lady questioner, Mr. Elliott said he would not attempt to transplant lilacs which had been growing fifty years. He was decidedly opposed to transplanting either old trees or shrubs. He had observed that the results were always unsatisfactory, and that young vigorous stock planted in extra deep and rich soil always gave quicker and better results.

Henry L. Clapp expressed his strong interest in hardy herbaceous plants and shrubs, especially in the Golden-rods, Asters, Hardy Chrysanthemums, and Clethra. These plants, under culture in the George Putnam School Garden, have given great satisfaction. The *Aster lævis*, which was carefully cultivated, became a mass of flowers. The *Solidago Canadensis* came up in the yard, attained the height of seven feet, and spread out wide enough to fill a hogshead. They had fourteen varieties of Golden-rod and eighteen varieties of Asters. The purple Asters have proved quite successful. One, the *Aster Novæ Angliæ* L., a seedling, made a growth as large as a barrel. Indeed, the unexpectedly large growth and brilliant colors produced by these plants, led many outside persons to inquire about this garden of hardy plants. There is no finer yellow than that of the Golden-rods, and no finer purple than is shown by the *Aster Novæ Angliæ*, and when grown together they make a fine combination of color.

Being asked whether the California Privet is hardy at Boston, Mr. Elliott said he could not answer that question definitely. He thought, however, that it is not reliably hardy north of the latitude of New York.

William C. Strong had seen many hedges of California Privet, that were quite hardy and flourishing; others also that were not. The plant is largely used at Newport, R. I. Its success depends upon a good summer growth, and ripening of the wood.

In answer to a question regarding the disease that destroys many hollyhocks, Mr. Elliott said the disease was confined mostly

to the double varieties. He had not seen any single flowered hollyhocks attacked by it.

Mr. Strong spoke of several evergreens, among them *Kalmia latifolia*. He had nothing to say against the latter. It disappoints many persons, because they do not treat it properly. It is naturally a moisture and shade-loving plant, although after becoming well established it will endure bright sunshine.

Mr. Elliott said that although *Kalmia latifolia* usually grows wild in the woods, the best growth and greatest beauty of flowers of this plant he ever saw was in a space of cleared forest where it had grown up thickly, exposed to the fullest sunshine. He had seen it in a garden, and also in nursery grounds where it was growing better than it usually does when in a wild state. He had found that, like the Rhododendron, the Kalmia likes plenty of sunshine, but also like the Rhododendron it does best in a deep, moist but well drained soil.

Mr. Strong alluded to the fact that it grows on mountains, but water often abounds there; their being exposed to full sunshine under such circumstances is a very different matter from taking them out of their native soil, and replanting them not only in a strange soil but in the full blaze of sunshine.

O. B. Hadwen had taken many of these plants from the pasture, and planted them in open ground in the autumn months from September to November, and lost very few. But he always takes up a ball of earth with each root he transplants. It does not succeed as well in the shade of trees as in clear sunshine, but flourishes best in the trenched ground of a Rhododendron plantation. He esteems the *Kalmia latifolia* highly, and would like to have it selected for the State Flower. No flower surpasses it for a picture. He had been much interested in the paper read today, and took no exceptions to it. But there was one omission he would mention: the old-fashioned red Pæony, which is one of our best hardy flowering plants. He has a bed of it, about ten feet in diameter. They come up annually and produce a most brilliant display, which affords much enjoyment to him.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 9, 1895.

A Meeting for Lecture and Discussion was holden today at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair. The following paper was read by the author:

GLASS HOUSES, THEIR CONSTRUCTION AND HEATING.

By HENRY W. GIBBONS, New York.

I have the honor of being permitted to present to your attention this morning a paper entitled "Glass Houses, their Construction and Heating." Under this heading come not only such structures as are used for the purpose of raising plants or bloom for profit, but also greenhouses designed both for useful and decorative purposes on private estates; from the small amateur greenhouse for beginners in the art of floriculture, to the imposing ranges of palm and other houses on the estates of men of large wealth.

The owners of greenhouses for either of the above purposes have in the past been continually asking for structures more permanent and economical, more effective for the purposes intended, and more decorative and artistic in design than has heretofore been obtainable. It is today the aim of the leading horticultural architects and builders to satisfy these demands, and I feel gratified in saying that the art of greenhouse design and construction — for it is truly an art — has reached that point which enables us today to construct a house that is as near perfection as we can approach. Of course, in this perfection there are many grades, the grade being decided by the objects for which the houses are intended, the value of the land upon which they are to be built, the amount of money to be invested, and many other considerations.

I shall divide this essay into two parts. In the first, I will call your attention to houses constructed for the use of the commercial grower, and in the second to those designed for private use.

COMMERCIAL GREENHOUSES.

As the primary object of such structures is profit, a great deal of careful thought and consideration is necessary in their design, location, and erection. Competition in floriculture is

today so close and sharp that the grower cannot afford the expense of the continual repairing and rebuilding which was practised under the protection of extravagant profits; therefore we must look for structures as permanent as possible, and at the same time not requiring a prohibitive amount of capital for their erection. The perfect quality of plants and bloom now demanded by the purchasing public compels us to design houses of such shapes and dimensions and so arranged as to location and furnishing in the matter of light and heating and ventilating facilities, as will produce the best results. Thus we see that the vital requirements of a commercial greenhouse are *economy* and *adaptability*. By the expression "economy" with reference to such structures, two distinct impressions seem to be conveyed; one indicating low first cost, which would result in the greatest profits in a short time; the other, which is the more correct impression, indicating the lowest first cost which will result in a reasonable profit for the longest period.

We will now consider the construction of greenhouses coming under this first impression, which, for lack of a better name I will call "Temporary Economy," as against the second impression, which I will name "Permanent Economy."

Temporary Economy. A grower starting in business with a limited amount of capital is compelled to build under the temporary economy style, and the best construction for that purpose is that known as sash-bar construction. Fig. 1, gives a reasonably clear general idea of this style of construction. Posts may be of various woods, such as locust, cedar, cypress, or chestnut, the first being the most, and the last the least durable, and the average cost would be about in the same order. My preference is for cypress, as it is easily procured at a reasonable price, and is of very lasting quality, whereas locust and cedar are in many localities unprocurable, and chestnut is not sufficiently durable for this purpose.

It would be well here to consider the kinds of woods best suited for the complete construction of such houses. I would say, without hesitation, use cypress throughout, but be careful what kind of cypress, for there are various grades of this wood, some of them being of an exceedingly open and woolly nature, difficult to work, and having a tendency to warp and twist, which renders them unsuitable for greenhouse work. I think without doubt the

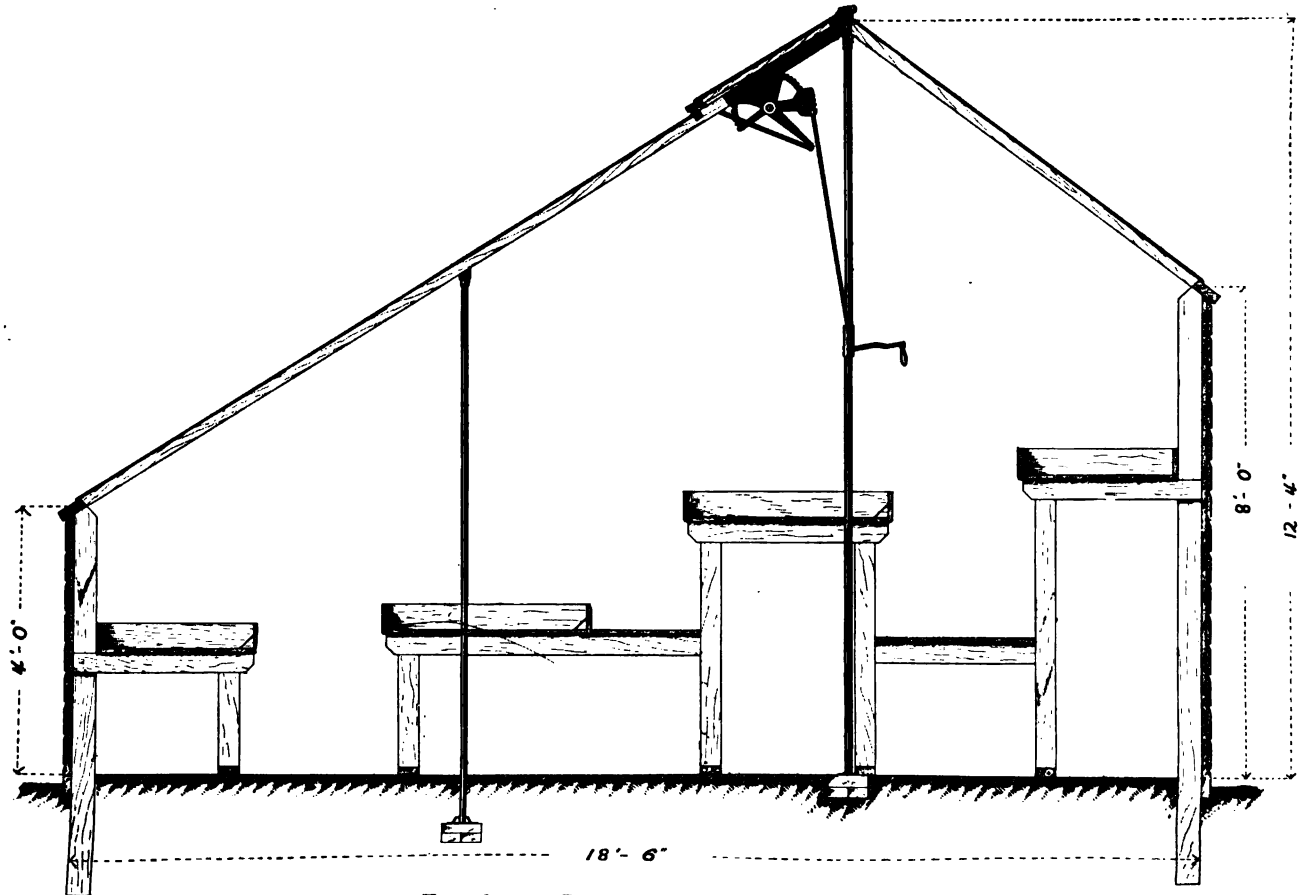

FIG. 1. "SASH BAR" ROSE HOUSE.

best for our work is red cypress — that which comes from the Gulf States, it being of closer fibre, greater strength, elasticity, and durability, and, therefore, much to be preferred to the white cypress of the Central States. Cypress absorbs water very easily, and if well seasoned and air-dried gives it up freely without detriment to the wood, but if kiln-dried the absorption of moisture will be very excessive, and cause much trouble by warping, twisting, and undue swelling of the wood when wet. I would strongly advise those contemplating the erection of their own greenhouses, not to purchase cypress from their local lumbermen, for cypress handled by them if not *always*, is, in *almost* every instance, kiln-dried stock, as this is the only stock in demand by the general building trade for interior finish. I would suggest that you either buy from the producers, emphasizing very positively that what you wish is air-dried and *not* kiln-dried stock, or from some reputable firm of horticultural builders, who carry a stock of sizes and grades best suited for the purposes in view.

We do not know the durability of cypress under the conditions found in greenhouse construction, but we do know that it lasts much longer than any material heretofore used.

Having satisfied ourselves as to the material, we will now pass to the details to be used in the construction of the house under consideration, which is generally known as a Sash-bar house. The most serviceable size of posts for a greenhouse, say about eighteen feet and six inches wide, is two by five inches, and they should be placed from four to four and a half feet apart; in many cases they are placed from six to eight feet apart, with a two by two-inch intermediate post, used centrally between these main posts to give stiffness and nailing facilities for the siding. The posts should extend to a depth of from two and one-half to three feet below the ground line, the depth depending on the nature of the soil, and the latitude in which the houses are being erected. The height will be governed by the purposes for which the house is intended; for ordinary greenhouse purposes, if provided with glass below the eaves, either movable or stationary, the height should be about four and one-half feet above the ground, but if solid board sides are desired, as in the house under consideration, the height of the posts need be only about four feet, and that on the north side of a three-quarter span house eight feet. These dimensions usually give ample height above the

side bench, and allow of good head room in the side path. As wooden gutters should, in all cases where possible, be avoided, they being the first part of a house to rot out and cause all parts with which they come in contact to decay with them,—and these parts of the house are very vital as a usual thing,—we will consider a house without gutters. Iron gutters may be used, but they will come under the heading which I have named "Permanent Economy," and will be considered later. If, however, the rain-water is of such value that the wooden gutters must be used, I would suggest their being made from the solid stick, usually four by seven or eight inches, the gutter parts being dug out, and the gutter attached as an independent part, which may easily be removed from the house at any time without detriment to the structure. The tops of the posts should be cut on a line to correspond with the pitch of the roof, usually seven and one-half inches to the foot, rising at an angle of thirty-two degrees, or, in the case of the north side of a three-quarter span house, about thirty-seven degrees.

The order in which the several parts of a greenhouse are assembled or set together varies with each builder, each adopting that method which he finds gives him the best results. These methods vary with the class of mechanics available, and also with the customs in vogue in the various sections of the country. No set order that I could describe would meet with approval in all sections; so I will proceed only to describe the several details which enter into the construction of the houses, and for convenience will start at the ground line and work up.

We have already described the posts, and will now consider the siding. The first or inner siding should be of that shape known as "beveled ship," its section being such as to make a tight joint, which does not show the effects of expansion and contraction, and principally one which affords no lodgment for water. This siding should be nailed directly to the outer side of the posts, care being taken not to make the joints of two lines of boards one directly above the other on the same posts. The usual practice is to start the upper line with a full-length board, the next with a half length, the next a full length, and so on, downwards. Many use a narrow, tongued, grooved, and beaded vertical ceiling for the inner boards, but I do not approve of this practice, as it creates so many more joints and recesses for the reception of moisture,

which is held in them by capillary attraction, this being in such cases with small quantities of water greater than the attraction of gravitation, thus causing a much more rapid decay than would occur with the use of the beveled ship siding above described, besides not giving the house the longitudinal bracing and stability so very desirable in such a structure.

For the outer siding two patterns of milling are in general use; seven-eighths-inch clapboards, and novelty siding. The latter makes the neater, warmer, and more durable covering. This second, or outer, siding should be divided from the inner by means of some non-conducting material. I think the best for this purpose is a good grade of rosin-sized building paper. A grade weighing about one-twelfth of a pound per square foot would be very well adapted. This paper should be tacked directly to the inner siding, and the outer siding should be nailed directly over this, care being taken to mismatch all joints of each of the sidings, and make all vertical joints over main or intermediate posts. It is a very bad practice to nail to the inner siding only, as the nails will push through and present a very unsightly appearance, allowing moisture to settle on the breaks thus made, and causing rust and premature decay; also not giving sufficient hold to the nail, and allowing the outer siding to be drawn off if it has any tendency to warp caused by the heat of the sun or by outer moisture.

The next detail to be considered is the eaves-plate or, as many call it, the lower glazing strip. Its size and shape vary somewhat under differing circumstances. Its main object is to afford a support for the glass and glazing bars, and make a weather-tight connection between the board sides and the glass roof. A very convenient size and shape for this piece, in the house under consideration, would be six inches by two inches, having on the under side two plow grooves, the lower and larger one being for the reception of the upper edge of the outer siding; the upper one, a small groove about a quarter of an inch square, to act as a break, and prevent the waters of condensation from the roof reaching the siding, the groove causing the water to fall at that point. On the upper side, no special milling is necessary, but the two edges, especially the upper one, should be cut to a slight bevel. This is to give a bearing for the glazing bar. If your wood is being machined in a well-appointed mill, I would also

advise the beveling of the lower edge, so as to reduce as much as possible the exposed surface of this stick, to which the moisture would be liable to freeze, causing ice to back up under the edge of the lower lights of glass and break them.

Next in order comes one of the most important details of the house, the roof glazing bars, or as they are generally called, the "sash bars." The object of these bars is to support the glass, and for this purpose a light section of lumber only is required, its dimensions being governed by the length of the bars to be used without the assisting support of a purlin. I find in ordinary practice, assuming that sixteen-inch by twenty-four-inch glass is being used, for bars having a distance of about five feet between supports, one and three-fourths inch by one and one-eighth inch is ample, and for those whose supports are eight feet apart, two and one-fourth by one and one-eighth inch is well suited, having ample strength for the strain brought to bear upon them, and yet being of such dimensions as to cast but little shade. These bars should have on their upper edges suitable rabbets for the reception of the glass; the bottom of these rabbets being made in the shape of a V as a receptacle for the putty necessary in glazing. A groove is also run in each side of the bar to carry off the water caused by the warm, moist air of the house striking the cooler glass surface and condensing, and thus preventing its falling on the plants and causing injury.

I wish here to call your attention to two very important points to be considered in designing or erecting greenhouse structures: first, avoid as much as possible any detail which will throw shade, and, second, avoid all recesses, mortises, or other places where moisture may find lodgment. Both of these items are of the utmost importance, yet are generally overlooked by the novice in greenhouse building, and I am sorry to say are often neglected by older heads, particularly the latter items,— mortises or other places for lodgment of water. If you desire to use bars which are provided with the groove on each side for the carrying off of the waters of condensation, as just described, be sure that the outer sides of this gutter or groove at the lower end are cut away so as to allow the water to drop out just before reaching the eaves plate, or glazing strip, or entering any joint which may have become opened from various causes, thereby producing premature decay. This small feature of cutting condensation grooves at the

lower end is of the most vital importance, its observance or neglect making a difference of many years in the life of a glass house, and yet I never remember having seen it practised by any other builder than myself.

Next in order we come to the purlin. This may be of wood, about two by three inches if desired, but as the cost of an iron purlin drilled to accommodate the correct spacing of the glazing bars for the proper reception of the glass, is so very little in excess of that of the wood purlin, and considering that the iron will cast much less shade than the wood, I would advise giving it the preference. If an iron purlin is decided upon, and you wish to order from a firm of experienced greenhouse builders, send them a small piece of the bar you intend using, state the size of the glass, and trust them to drill the purlin correctly. They will also arrange for suitable splicing of the iron, and for caps to receive your iron pipe columns, which are necessary to support the purlins. If, however, you desire to do the drilling yourself, or have your local mechanics do it for you, to the width of bar in sight between the rabbets, usually about half an inch, add the width of the glass, say sixteen inches plus one and one-sixteenth inches, for play; this will give you sixteen and nine-sixteenths inches between centres of bars, and this will be spacing of holes necessary for securing bars to purlins. The size of the holes should be three-sixteenths of an inch, which will accommodate the No. 8 round-headed screws. The section of iron best suited for the purlin is two by one and one-fourth inches by one-fourth angle; if this cannot be easily secured, one and three-fourths by one and three-fourths inches by one-fourth angle may be substituted. The size of the columns for the support of these purlins, depends upon the extent of roof they have to support. For the southern slope of an eighteen feet six inches wide, three-quarter span house, one and one-fourth-inch gas pipe will answer, or, for each slope of an even span house of the same widths, one-inch pipe is ample, placed about eight feet apart.

We next come to the header which makes the connection of the roof ventilating sash and the roof. In houses such as we are now considering, I prefer to run all bars up to the roof and fit the header over the bars.

The ridge of such houses as these plays a very important part, as on it devolves the duty of giving and maintaining a true roof

line. Of all the parts of the house, it is most important that the ridge should be of perfectly air-seasoned timber. It should be sawn from a sound log, straight and true to the grain, and free from heart or sap. If you are unable fully to meet these requirements, in cypress wood, which is often difficult, I would advise the use of yellow pine. In fact, in my own practice, I use yellow pine exclusively for this purpose, as I realize the great difficulty in securing a straight line with cypress, under the peculiar exposures and conditions which surround the ridge of a glass house. The ridge should be two by six inch plank and machined as shown, one side being arranged for the reception of the ventilator, and the other for that of the roof glass and bars, as shown. A suitable cap three by one and one-half inches, machined as indicated, is securely fastened to the upper edge of the ridge.

We will next consider the ventilating sash. For ordinary sized houses they should be three feet deep, and continuous on either or both sides of the ridge. The point at which these sashes should be hinged, whether at the top or the bottom, does not admit of much discussion, as each method affords equal ventilating conveniences, and the advantage gained by hinging to the ridge and relieving the bars of the weight of the sash is so obvious that this method is recognized as the standard, although there may be isolated cases in which the geographical surroundings are such as to make the hanging of the sash at their lower edge desirable. But these cases are so few that this method needs no further comment in a general discussion.

The cap described has three objects: first, to protect the ridge, and help it keep its alignment; second, to support the sash; and third, to make the joint between the sash and ridge weather tight. The ridge of a three-quarter span house of the above class requires support by means of one and one-half or two inch pipe columns, or three by three inch wood posts, about every eight to ten feet.

Iron-Frame Greenhouses.

We will now pass to the more important style of commercial construction, which comes under the head of Permanent or True Economy, and is generally known as Iron-frame construction, the object in view being to make as much of the structure as possible practicably indestructible, but at the same time bearing in mind the requirements and conditions which are peculiar to greenhouses.

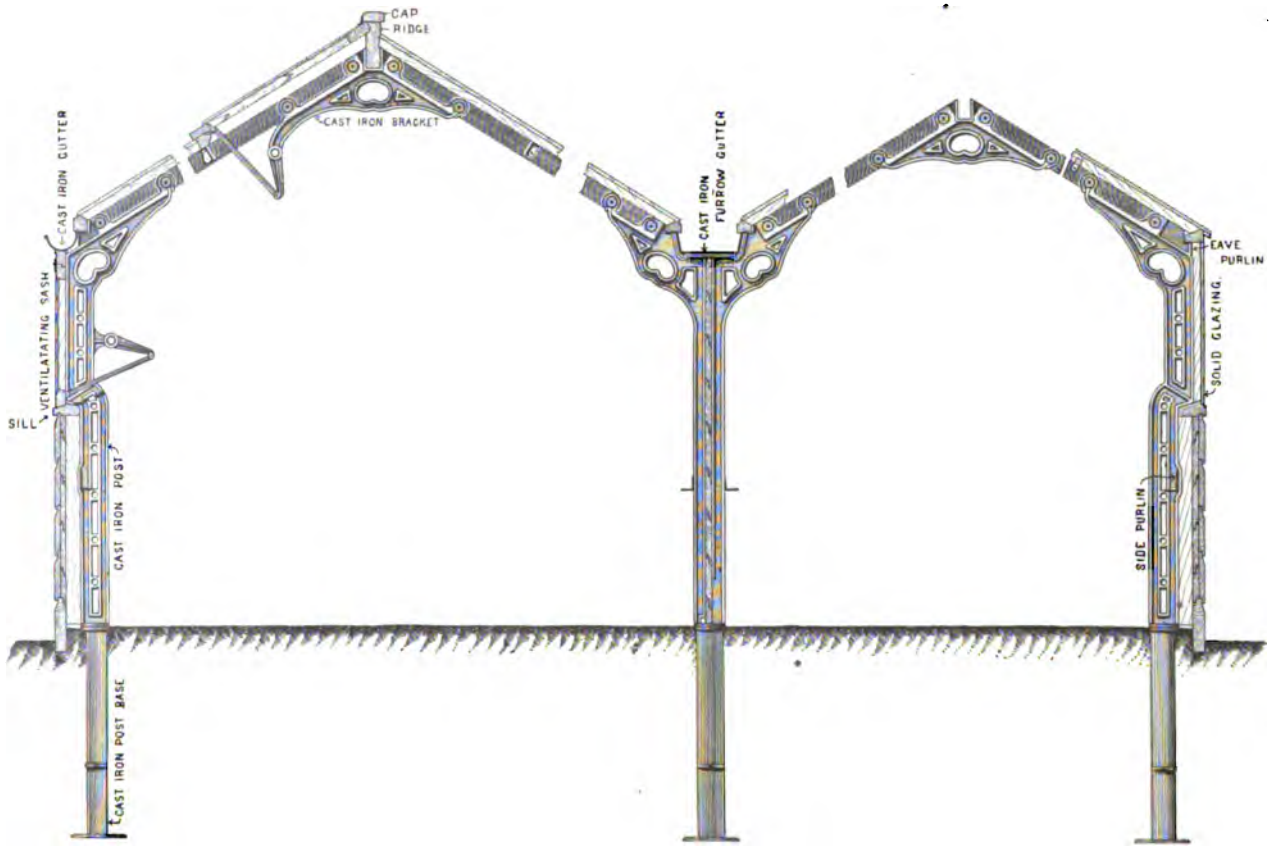

FIG. 2. SHOWING CROSS SECTION AND DETAILS OF IRON FRAME GREENHOUSE CONSTRUCTION.

It is the lack of a thorough knowledge of these conditions with builders and architects in general, that is responsible for the thousands of greenhouses throughout the country which are practically useless for the purposes for which they were built, and has thus caused loss of interest in plant culture, in addition to the loss of dollars, to those who otherwise undoubtedly would have been the means of materially furthering the interest of the public in matters horticultural, and consequently would have helped to create a greater demand for the products of our commercial growers. I mention these facts just here in order to emphasize the advisability and necessity when building glass houses, of first making yourself acquainted with the most perfect methods of construction; and without question, the easiest, quickest, cheapest, and in every way the most satisfactory means of doing this is to consult some prominent and progressive firm of horticultural architects and builders — men whose whole thought and energy are bent in this particular direction.

The details for a perfect iron frame for a commercial house may be seen by Fig. 2. It will be noticed that for the foundation a cast iron post base is used, which may be made of any desired length, according to the nature of the ground upon which the house is to be built. The post bases are usually about two feet, six inches long, and are set into the ground to their full depth, the tops being about on the level of the floor-line of the house. To this base is bolted an iron post, the post in this instance being that used by Messrs. Hitchings & Co. in their improved patented construction. Other styles of iron posts may be used, such as the ordinary angle or T iron of commerce, but care must be taken to select them of such a shape and of such dimensions as will not only support the dead weight of the house but also have no tendency to warp, sag, or twist, in case of strains being brought to bear in other directions than vertically as above stated. The advantage of the cast iron post, in addition to being designed with a view to convenience of attaching other parts of the frame to it, is its great stiffness, strength, and general adaptability.

We will now pass to the rafters. I find in general practice when a suitable bracket is used for connection of rafter and post, and of rafters to each other at the ridge, that where the length does not exceed seven feet between supports, (except in the case of grapery roofs) a section of flat iron two inches by one-half

inch is ample; where supports are from seven to eleven feet apart, two and one-half-inch by one-half-inch iron will serve, and so on.

The rafters are tied at their upper ends by iron brackets which have a recess or socket to receive the wooden ridge already described. I have often been asked why I do not use an iron ridge, and I suppose this question has come to the minds of many present, when considering this subject. An iron ridge is unnecessary, and presents many objectionable features. A wooden ridge and cap of some description are necessary for the weather-tight and proper connecting of the ventilators and roof, and to add an iron ridge, of such dimensions as would give to the building the stiffness and stability that a two by six-inch yellow pine ridge will, would so add to the amount of shadow thrown upon the house as to be prohibitive; it would also entail additional and unnecessary cost. The bracket should also have conveniences for carrying the shaft of the ventilating apparatus. We have then in this bracket a combination of three parts. First, a convenient and practicable tie for the rafters; second, a suitable means for connection between the ridge and the iron frame; and, third, bearings for the vent shaft, combined in one casting, which not only causes a saving of first cost, but a saving of labor in the course of erection.

These pieces comprise the main supporting trusses of the structure, and we will now consider the parts which are requisite for the tying of these trusses or sections together, and for the support of wood and glass on those parts between trusses, which as I have before stated are placed eight feet, four and one-eighth inches apart. This is for glass sixteen inches wide. If narrower glass is used, a lesser spacing of the trusses will be necessary.

The posts are tied together by means of two lines of angle iron purlins, the lower of which is placed about one foot, six inches above the ground, and is of three by two inches by three-eighths inch angle. Its uses are, first, to tie the posts together, and, second, to give support to the two-inch by one and one-fourth inch by one-fourth-inch angle eaves, or gutter purlin and plate above, by means of a light intermediate post connecting the two together. These two purlins so connected give ample support to that portion of the roof below the lower roof purlin; also to the gutter and header supporting the side ventilating sashes. The lower purlin is also used as a back support for the side bench, and thus obviates the necessity for any back legs, or for attaching this

bench to the wood siding and thus causing early decay at such connections.

For the connecting of the rafters, giving longitudinal stability to the roof, and for the support of the glazing bars, two inch by one and one-fourth inch by one-fourth inch angle iron purlins are used. This size of iron is selected, as the two-inch web gives the necessary strength, and the one and one-fourth inch gives sufficient surface for the attachment of the roof bars by means of small screws, yet throws but little shade. These purlins are spaced according to the length of the rafters, and the size of the glazing bars in use, the upper one being so placed as to afford support for the upper ends of the glazing bars, they all resting on the purlin about one-fourth to three-eighths of an inch, and being toe-nailed to the cypress header which is screwed on the purlin.

The ends of the house are braced with one, two, or three lines of purlins, according to the width and shape of the house. Iron doorposts fastened to cast iron bases in the same manner as the side posts, run up to the rafter and are tied together by a cast iron doorsill at the bottom. The end purlins just mentioned run from the end posts and rafters to the doorposts, thus forming a very stiff end, and one to which the necessary light woodwork is easily attached.

We now come to the last part of the iron frame, but I think one of the most important, namely the gutters. The gutters should be of iron, but even that would be of no advantage unless we could prevent their contents from being frozen, for, as we all know, in the process of freezing expansion takes place, which is liable to burst or crack the gutters. I show here, however, a non-freezeable gutter, of cast iron. It is so arranged that a small portion of the inner warmth of the house is conducted to the contents of the gutter, and thus prevents their being frozen. These gutters are in use very largely throughout the country, and I have never known in a single instance of their contents becoming frozen sufficiently to prevent a free flow of water. I have, in very low temperatures, ranging from zero downward, seen the outer surface of the gutter coated with ice, but the warm side is at all times free. This is a very important feature. First, it is a permanent portion of the house, whereas the old wooden gutter was the first part to rot and communicate decay to all its surrounding parts. Second, it prevents the possibility of ice forming

and continuing up the roof between the lower laps of glass, and by its expansion causing considerable breakage. Such breakages are at all times expensive, but especially at such times as this, when the temperature is low and the cold currents of air passing through the broken glass may cause great damage to, or loss of plants or bloom. Third, they provide at all times a free passage for water from the roofs to drains or sewers, or, in many cases when it is valuable for irrigating or other purposes, where a supply of water under pressure cannot be obtained, to suitable tanks or cisterns, built within the houses. They also prevent the unsightly slopping over, which takes place with gutters whose first contents have become frozen.

We will now consider such details in the woodwork in connection with an iron frame house as may be different from those already described in connection with the "All-wood," or "Sash-bar" house. We find first the sill against which the side ventilators close; this is of a shape well known to all, and is cut from a two by four-inch joist, the under side being milled with a plow groove for the reception of the upper edge of the inner siding, and two smaller grooves to prevent water creeping along under the sill inside and running onto the boards. The upper side has the usual rabbet for the sash to shut against, about one-half inch deep, and the surface is beveled to shed water. The side ventilator is of various depths for different purposes; generally about twenty inches, the top rail being rabbeted, as is also the small header which makes connection between the sash and the gutter. This rabbeted joint makes a very weather-tight and close connection. The eaves or gutter strip is screwed to the upper surface of the eaves purlin, and is fitted with a plow groove on the under side, for the reception of the gutter's upper edges, which act as a weather-break. The upper surfaces are beveled, the outer one to the pitch of the roof, and the inner at such an angle as to give support for the foot of the roof bars.

At this point, I wish again to caution you against the very common practice of having mortises cut in the strip for the reception of the roof bars. This mortise and tenon style of connection is very largely used, yet it is without question the feature which leads to the first and most serious decay in a glazed roof, no matter how perfectly we may make the tenon fit into the mortise, or how careful we are to have all such joints painted

before connection. A large proportion of such joints, under the varied changes and strains to which they are subjected, will open, and, be it ever so little, it is fatal to that part of the roof, as moisture will accumulate in the mortise, remain there, and the result will be as I have stated,—premature decay.

The next, and I believe the last, feature of the woodwork, excepting the doorposts, which differs from the construction already described, is the piece known as the roof ventilator header; it is really the roof bar header. The section of this is shown in Fig. 2. It is securely screwed to the purlin, leaving about one-fourth to three-eighths of an inch of surface on the lower edge of the purlin for the support of the upper ends of the roof bars, as before described. It is generally from this purlin that all drip of condensation formed upon the roof-vent accumulates, and falls to the plants below, causing considerable damage, and it is to avoid this annoying drip that we use the peculiar shape of header here shown. The object of the rabbet or groove on the upper side is to collect all drip from the lower rail of the ventilator and by means of small channels cut through to the outer air to carry such water onto the roof. One would expect these channels to become frozen up and useless in severe weather, but such is not the case. The little current of warm air which is allowed to escape through these grooves prevents them from becoming clogged with ice.

Glass Houses for Private Estates.

I think I have considered the construction of commercial houses sufficiently for the present, and as the glazing, painting, heating, and ventilating of both commercial and private structures are the same, I will consider them later under their separate heads, and will now pass to the construction of glass houses designed and arranged for use on private estates.

The construction of such houses differs very slightly from that of the iron frame commercial house just described, the principal difference lying in the fact that they are usually built upon brick or stone walls instead of having posts set in the ground, with the double-boarded sides.

In the past many styles of both solid and hollow walls have been tried, but it is now an established fact that the only wall suitable for greenhouse foundations is a solid one from twelve to sixteen inches thick, according to the weight or thrust it is

intended to support. Great care should be observed in the bonding of such walls. Undoubtedly the best bond for such purposes is that known as "Old English," which consists of alternate headers and stretchers, the objection to this being that as the dimensions of bricks vary in different localities, many are such as to make it difficult for the mason to prevent several vertical joints coming directly over each other, and thus causing a weakness in the wall. This difficulty can, however, be overcome if a little care is exercised and the mason when finding joints overrunning will cut a brick or two to bring joints into the desired position. The next manner is to make every third course of headers; this finds preference with most masons, and gives a good, substantial foundation.

Theoretically, hollow walls are warmer than solid ones, but in practice they are colder and much weaker, and will be found a source of constant trouble and annoyance, unless you are willing to make both sections eight inches thick, which, with the addition of the air space would make a wall twenty inches thick, and besides being very costly, would occupy more space than we should care to devote to such a purpose.

The difficulty with the hollow wall, as ordinarily constructed, *i. e.*, two four-inch walls with a two or four-inch air-space between, is that the action of the elements on the outer wall, and that of the heat and moisture on the inner wall soon cause the joints to crack, thus allowing a circulation of air to take place between the walls, which destroys the looked-for warmth caused by the nonconductiveness of the dead air space, and the variable strains brought to bear by expansion and contraction, heat and cold, dryness and moisture, on the two four-inch walls are such as soon to break all bond between the bricks; and unless the two walls are so tied together as to be practically solid, they will bulge and warp, and endanger the entire superstructure.

I would particularly caution you against the use of a single face of four-inch brick on the outside; if any particular color or make of brick is desired, for the sake of appearance, make the outer headers, as well as the stretchers of such brick, and see that the inner brick are of the same size as the face, or make the entire wall with the special bricks. No amount of wire or metal ties will take the place of brick bonds in a greenhouse wall. This same caution pertains to the facing of the inside walls with white enameled bricks, which give a very nice and clear effect. If such

bricks are desired, see that they are exactly the size of the others you are using, and enameled on such of their several surfaces as to enable you to get one of the bonds above described. A good mortar for greenhouse walls is composed of two parts of clean sharp sand and one of good Rosendale cement.

Upon the foundations, which usually extend above the ground to about two feet six inches, a heavy cast iron sill is set in equal parts of Portland cement and sharp sand. With such a sill, having the centre web below the rabbet which rests on the wall and becomes embedded in the cement, any cross movement of the sill upon the wall is prevented, and no anchor bolts are necessary.

The iron frame of the superstructure, which is in general similar to that already described, is bolted securely to this sill.

The woodwork used upon these houses is of the same general shape and detail as that already described, but is preferably of clear white pine, in order that a higher finish may be obtained, as cypress, no matter how carefully and smoothly it may be milled, becomes woolly and rough by contact with moisture, and this prevents its use in greenhouses where a permanent high finish is desired. In curvilinear houses the iron rafters should be bent to fit the roof lines, and this bending, except in the case of a very large radius being used, should be done while the iron is heated to a proper and even temperature; otherwise, its strength is greatly impaired. Of course great care must be exercised in the heating of iron for such bending, and ovens and other conveniences especially designed for this purpose are necessary to prevent an uneven heating or burning of the iron, which would be equally as destructive to its strength as would the cold bending.

Glazing. I will now pass to some important details in glass houses, and first the glazing. The first thing necessary is to get suitable glass. For roses, and other plants which require the most perfect light, I would certainly recommend the use of French or Belgian glass — that known generally as double thick, second quality, the first quality being too expensive and not possessing any material merit for plant culture other than that possessed by the second quality. For other greenhouse purposes, I believe glass of American manufacture is well suited, and have no doubt that the time will soon arrive when we shall be able to compete in quality, as in price, with glass of a foreign make. I think that the only reason our domestic factories do not produce

glass equal to that of foreign competitors is the higher cost of labor, but improved methods of manufacture will soon equalize these matters. The advantages of foreign over domestic glass are chiefly greater clearness, toughness, or strength, and absence of waves.

Methods of Glazing, etc. There is only one perfect method of glazing for greenhouse work, and that is with light wooden bars, and the glass bedded in suitable putty. The bars should be so rabbeted as to leave a V shape, the putty being rubbed into the V, and the glass then rubbed and pressed down firmly, until the lower side rests on the sharp edge of the wood, and solid zinc shoe nails or other suitable points are driven into the bar above the glass to prevent its displacement. The surplus putty both above and below the glass is then carefully cut away, and in painting, the paint should be laid on thickly over that putty which may be exposed on the upper side between the glass and the bar, and also on the glass which is directly over the bar. This effectually preserves the putty in the joints from the detrimental action of the atmosphere.

A system which, at first sight, and to the uninitiated, appears to have extraordinary merits, and yet which yearly causes a great waste of capital, and is the source of great annoyance to those who employ it, as well as regret to those who have innocently advised its use, is that known as the metallic glazing. There are many systems of such glazing on the market, both patented and otherwise, but, my friends, I cannot advise you too strongly against the use of any one of them, or any so-called improvement or modification of them.

In order that you may realize the defects in this system, I will ask your attention to the following points: First, because of the unyielding surfaces of both glass and metal (soft sheet lead excepted), it is impossible to get a perfect contact one with the other, and without perfect contact a perfect and air-tight joint and security of the glass is impossible. An air-tight joint may be made by the intervention of sheet rubber, sheet lead, cotton saturated with white or red lead, and many other substances, but it is only temporary, as the effects of moisture and variation of temperature will soon cause decay on the one hand, and the continual friction, caused by the difference of expansion of the metal surfaces and the glass will soon wear away the intervening packing. This continual friction also causes a wearing away of

the surfaces of the metal, and in the case of galvanized sheet iron destroys the galvanized surface, and exposes the iron to the rapid and destructive action of rust.

There are many metal glazing bars in the market, made of zinc and other so-called non-corrosive materials, for which it is claimed that there is sufficient spring to prevent this above-described friction, and while to a certain degree this may be true, in the direction of one bar from another, yet this friction and consequent destruction and displacement is equally as prominent as in some bars without this spring, and in many cases more so, in consequence of the expansion of the bar in the direction of its length.

Another serious difficulty connected with metal glazing is the great loss of heat in the building, caused by the rapid radiation of heat through the metal surfaces exposed to the inner and outer air. No part of the metal frame of a greenhouse, excepting a small portion of the gutter should be exposed to the outer air.

For the glazing of houses having curvilinear roofs, I would advise having the glass bent to fit the curves. This allows the use of lights of glass twenty-four inches long, and insures a much neater and tighter roof than can by produced by using many short lights around the curves, as was done in times gone by. Many think that the curved glass is very liable to breakage during hail-storms, but experience has taught us the reverse, and this is easily explained, as in the bending the glass becomes annealed or toughened.

Painting. We will now consider the painting of greenhouses. This feature should receive close attention, as upon its use or neglect rest in a great measure the durability and weather-proof qualities of the structure. All parts should be well primed before erection, the iron being scraped, or brushed with stiff steel brushes, to remove all scale, sand, or grease, and then coated with a good quality of anti-corrosive paint and pure linseed oil, using as little dryer or turpentine as possible. The wood, which of course we assume to be perfectly dry and clean, should be well saturated with white lead of good quality and pure linseed oil, either by dipping or by careful laying on with the brush.

After erecting and glazing, the whole house, both iron and wood, should receive two more coats of pure linseed oil and good white lead, thinned with a little turpentine, one coat being perfectly dry before the other is laid on. After the expiration of one full year, the entire outside of the roof and glazed portions of the house

should receive one additional coat. It will be found very advantageous, if a small percentage of oxide of zinc is mixed with the white lead used for painting the inside of the houses. This imparts a much brighter whiteness, and prevents the growth of the gray fungi which adhere to interior surfaces painted with the lead only, and which give the inside of the house a dirty and untidy appearance after a short season's use. This mixture is used now very largely in Government work, and also in the greenhouses at the Executive Mansion at Washington, it being there, I believe, that the original experiments were first made, and the good results discovered.

Ventilation. Ventilating conveniences play a very important part in the furnishing of a greenhouse, the usual system being to have a continuous line of sash about three feet deep along one or both sides of the ridge, and also a similar line below the gutter or eaves line, these being operated by some suitable mechanical means; preferably by the well-known worm and wheel apparatus.

Heating. The heating apparatus plays the most important part in the furnishing of a greenhouse. There are three systems of heating in use; namely, first, by means of hot-air flues; second, by means of circulation of steam through coils of pipes; third, by means of a circulation of hot water through coils of pipes. The heating by flues is a very primitive method, but is often resorted to in consequence of its small first cost, but its cost of maintenance is greatly in excess of that of either steam or water heat, and its results leave much to be desired, as the flues will become leaky, and allow dust and gas to escape into the greenhouse, and destroy all but the hardiest stock. Steam heat comes next in the order of merit; it also has the advantage of comparatively low first cost, but also has the disadvantage of being costly of maintenance, both in the matter of fuel, attention, and repairs. This system is largely in use, and finds many advocates. Hot-water heat, while entailing greater first cost, is the system in general favor, being economical in fuel, requiring very little attention, entailing no cost for repairs, and at all times, when there is any fire under the boiler, being positive in its action. Thus far, it must readily be admitted that the hot-water system of heating is the most desirable, but we have yet to consider the effects on plant life. Steam heat, on account of its intensity, has a tendency to dry the atmosphere of the house to the injury of the plants, but this can be easily counteracted, by means of frequent and

liberal syringing, and if the necessary moist condition of the atmosphere is maintained, the effect of hot water and steam heat upon the plants will be equal; therefore, we find the merits of these systems as follows:

In favor of the steam system: Low first cost, being from seventy-five to eighty per cent of that of a similar hot-water plant.

In favor of the hot-water system: Economy of fuel and ease of management; absence of the necessity for repairs; positive circulation, and consequent radiation of warmth under all conditions of the fires.

The *objections* to each of these systems are; *To the steam system:* Additional fuel consumption, necessity of skilled and continual attention; liability to accidents, leaks, etc., and consequent cost of repairs; total loss of radiation when fires become so low as to allow the temperature of the water to drop below 212°, and consequent loss and damage to stock.

The hot-water system has *one disadvantage* only, namely, higher first cost. I am thus compelled to give the preference to the hot-water system, and will proceed to mention some details which are desirable in its arrangement. Of course, it is understood that the heating of greenhouses must be by a direct system, as no indirect system would give a sufficiently even distribution of the warmth for this purpose.

Two systems of water heating are in use; the first being known as "upward circulation," by which we understand a continual upward grade of the pipes, to a point farthest from the boiler, and a downward grade from that point back to the boiler. The second is known as "drop circulation," where the rise to the highest point is taken directly over the boiler, the pipes then grading downward all the way back. I do not think either of these systems should be given a preference as regards their effect, under ordinary circumstances; but as the "upward" system presents so many less difficulties in the course of construction than the "downward," I would strongly advise its being used in all cases, unless some peculiar conditions of grades or other details of arrangement of the houses exist, which might render the "downward" system advisable.

Benches. In the furnishing of a greenhouse, we must not overlook the benches. If low-cost benches are desired, they may be made of cypress, but for the commercial grower who is interested in future profits and small repair bills, I would advise

an iron bench frame with wooden bottoms, these bottoms being easily replaced at a small cost, without disturbing the main supporting frame. If a permanent bottom is desired, porous tiles may be used, which make a practically indestructible bottom, and one which is very beneficial to the plants, as it admits of a free drainage and circulation of air to the roots. For benches or tables in conservatories for the reception of plants in pots, a slate bottom is desirable, the slate being three-quarters of an inch thick, and planed smooth on both sides. This gives ample strength to support large plants.

I think I have covered the general details in connection with greenhouse construction, as fully as the time will admit, but if there are any especial features which anyone present may wish advice upon, I shall be pleased to give it to the best of my ability.

Discussion.

Kenneth Finlayson spoke of the difficulty of keeping paint from mildewing in greenhouses, especially tropical houses where there is always so much moisture — a condition that seems to favor the rapid growth of the gray fungus. He asked if there were any known preventive or remedy.

Mr. Gibbons advised in preparing the paint to use about twenty to twenty-five per cent of oxide of zinc with seventy-five to eighty per cent of lead. When in Washington some time ago, he visited the conservatory at the White House, and also other structures of the National Government, and was struck by the intense whiteness of the interiors after five to seven years' use. Upon inquiry he was told of this composition, which is found to prevent the growth of the gray fungi referred to, and also the peeling of the paint from the wood.

In reply to another question, Mr. Gibbons said the Hitchings gutters are of thin cast iron; the side next to the greenhouse is exposed to the interior heat, which prevents any freezing on that side, even in zero weather; joints are lapped a little and lined with cement, and all the bolt and screw holes are drilled a little larger than the diameter of the bolts or screws used. By these means all trouble from ice expansion in the gutters is prevented.

As to lapping or butting glass, Mr. Gibbons thought that lapping is always best. In butting glass it is desirable, if not imperative, that the glass should be of uniform thickness, a condition rarely found in either a small or large purchase of glass.

To a question as to best size of glass, Mr. Gibbons answered that, as a rule, the glass should be sixteen by twenty-four inches.

In reply to a question as to the object of grooves in sash-bars, Mr. Gibbons held that the grooves would receive the greater portion of water that was thrown or condensed upon the glass, and convey it to a point over the space between the back of the side benches, and the plate, where the lower side of the groove is cut away, and the water falls directly to the ground. Accumulation of dust in these grooves rarely amounts to an obstruction.

It was asked whether it is better to use four-inch or two-inch pipe for heating a greenhouse, and Mr. Gibbons replied that he prefers four-inch to two-inch pipe, although, other things being equal, the effects of both on plant life are the same. But the four-inch pipe is more reliable, having a larger reserve of heat for an emergency, and will last much longer than any smaller, wrought iron pipe.

Another question was asked as to comparative advantages of the upward and the downward systems of hot-water circulation in greenhouses.

Mr. Gibbons replied that formerly greenhouses were built to accommodate the heating system; but, as in these days we have often to accommodate the heating system to the greenhouses, he thought that under ordinary circumstances the system best adapted to the location, grade, and arrangement of the greenhouse would perhaps serve the purpose better than the other. But where the range to be heated includes more than one house, the drop circulation is difficult to manage; therefore, as stated in the paper read today, taking all things into account, he would strongly advise the upward circulation system in all cases except where the local conditions are such as to render the downward system necessary.

A question being asked as to comparative advantages of tiles or slate for the bottoms or floors of plant benches or stages, Mr. Gibbons said that tiles are in great favor for bench bottoms; they are much superior to slate when the bench is filled with soil in which plants are set, but, for plants in pots slate bottoms are preferable. The advantage of tiles lies in the fact that when they are made, a quantity of coarse sawdust is mixed with the sand and clay, and when they are fired the sawdust is burned out, leaving the tile very porous, thus securing perfect drainage and ventilation.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 16, 1895.

A Meeting for Lecture and Discussion was holden today at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair. The following paper was read by the author:

ECONOMIC ENTOMOLOGY IN RELATION TO TREES, SHRUBS, AND PLANTS, IN PARKS AND PRIVATE GROUNDS.

By EDMUND B. SOUTHWICK, Ph. D., Entomologist of the Central and City Parks of New York, N. Y.

I am here today to give some hints as to the needs in the care of trees, shrubs, and plants in parks and private grounds, and also to suggest such remedies as I have found of especial benefit in the care of vegetation in the Parks of the City of New York.

An experience of over twelve years has given me an opportunity to become acquainted with these needs, and also enables me to give some advice as to the proper care from an entomological standpoint.

Today I am addressing an intelligent body of horticulturists, who know a tree when they see it and also its family history and the fruits thereof; and you will agree with me, that ignorance of the subject is the greatest drawback to a proper appreciation of it, and therefore to a proper carrying out of the work in "Economic Entomology."

Happily, however, the times are ripening for a wider appreciation and better work—not so much, I fear, from the extra education as from the necessity of combatting insect foes which are becoming so destructive on every side—and men who own fine trees and shrubs are forced to admit that there is an importance attached to Economic Entomology, and that they must consult an entomologist just as they must consult a physician or a lawyer in necessary cases.

The people, however, are not educated up to the point of consulting the physician in this case, and even when the destruction is inevitable and they seek advice, they often will not take the trouble to prosecute the work.

Dr. Thaddeus William Harris, your renowned fellow townsman, was one of the first in the field to begin this education, and as far

back as 1831 he published a list of the insects of your State. The importance of his researches was so appreciated that he was appointed one of a commission for a more thorough survey of the geology and botany of your State, entomology, however, being still an outside issue, and only developed because of his knowledge of its great importance to future generations in the care of vegetable productions so essential to the life of man. Entomologists who see the possibility of increase so enormously displayed in insect life, are specially educated as to what will become of vegetation, if steps are not taken successfully to combat the hosts increasing both in variety and numbers.

As pleasant as it is for me to congratulate you upon the successful work already accomplished in your State, it is my more important duty to remind you that our knowledge of the work of keeping insects in subjection, is still but in its infancy, and we must not only be willing to work in lines that now look to us fairly successful, but must deliberately look for deficiencies, and study to devise more effective means to meet all these needs. Of the hundreds of letters I have to answer during the year, I have yet to receive one in reply, saying the advice was thankfully received and the work would be undertaken.

In one of our prominent Hudson River cities, the elm trees were being defoliated by the elm beetle last season, and one of the prominent citizens came to me in seemingly great distress and wanted to know what we were doing to keep our trees looking so well. After advising him and showing him our machines at work, he said he would at once have the work started and carried on. That was the last I heard of him until this winter, when another citizen of the same place called to see me — filled with still greater distress, if that were possible — and wanted to know what to do with the trees in order to preserve the foliage for the coming summer. He thought they were dying, and something must be done. I mentioned the fact that his fellow townsman had, I supposed, been destroying the insects during the past summer. "Yes," he replied, "That gentleman told us he had seen you, but did not think the work practicable." The truth was, it was too much trouble, after consulting the physician, to apply the remedy, and as soon as he found that it was not altogether slight-of-hand work, but real drudgery, he put it out of his mind and soon set aside the heavy responsibility. And this is but one

example of the use that is made of advice freely and gratuitously given.. Nine times out of ten nothing ever comes of it.

I must speak of another foe which deeply concerns trees, and that is *Fungi*. They not only destroy the foliage but break up the tree trunks themselves. Another practice I must also condemn is the wholesale cutting back of trees and shrubs by "tree butchers," who are so numerous in these days. As we ride about in the cars through our cities and towns, we see on every hand where these tree-vandals, have been at work, destroying thousands of fine trees, — actually beheading them. Again, we see the same men, cutting off great numbers of large limbs for no apparent reason, and leaving their large stumps or scars exposed to the action of the elements, insects, and fungi.

No study is ever given to the character of a tree, and elm, maple, and willow alike receive the same treatment. Our trees are too valuable to be destroyed in this way, and the time is at hand — at least with us in New York — when imported insects will do too much of this kind of vandal work, and we are already only too desirous to preserve a bud which will at some time develop into a branch to fill a vacancy that injures the symmetry of the tree and is an unsightly deformity in the eyes of the owner.

In the large city parks of New York, comprising over four thousand acres, there is a great diversity of foliage and tree growth, and therefore a great variety of parasitic life, both animal and vegetable. Like your own city of Boston, New York is a great importing centre, and new things are there being constantly introduced into our country. We are now suffering from some of these introductions, among which the Elm Leaf Beetle (*Galeruca xanthomelæna*) and the Wood Leopard Moth (*Zeuzera pyrina*) can be mentioned.

From a horticulturist's point of view, most of you know how to combat enemies of fruit trees, but perhaps not all who may read this are as wise in their generation, or even willing, like yourselves, to give the time and attention to these details that are so essential to success. I will, therefore, attempt to describe some of the most conspicuous enemies of our shade and ornamental trees, and also the most effective means of combatting them successfully. One of the most serious pests of the many that have been introduced into this country is the Wood Leopard

Moth, not forgetting your own troubles with the Gipsy Moth which you are so heroically fighting, under so able a general as Professor C. H. Fernald, and the great lesson you are learning of the necessity of the same concerted action in this as would be demanded in case of a terrible epidemic scourge.

The Wood Leopard Moth was probably introduced here about twelve or fifteen years ago, and since then it has grown in strength of numbers though not in public favor. The glamour of rare specimens of the moth in entomological collections, has passed its incipient stage, and we are actually in the midst of a fearful warfare. The enemy has already worsted us in many sections around the city, and I am sorry I cannot say that we are able to impede its progress, or that we have hope that it may be stamped out. I cannot say how soon you also will have to take up arms against this destructive foe, for I must confess to you that it is marching on, despite the efforts we in New York City are putting forth, and must eventually reach your vegetation also. It has already spread into parts of New Jersey and Long Island, and is steadily marching northward. This moth has already appropriated as congenial food, over one hundred species of trees and shrubs, and so far the evergreens or conifers seem to be the only ones exempt. The larva of this moth is able to amputate tree-trunks that are six or seven inches in diameter, by cutting a burrow around the trunk, which so weakens it that a strong wind is sure to break it off. Our elms and maples seem to be their favorite food, and thus far have suffered most. Our treatment for the destruction of this insect is to collect all affected limbs and destroy the larvæ we find in them. All limbs that are broken are taken down and destroyed by fire after we have removed and killed all the larvæ we can find. All the smaller trees of the parks are examined carefully, and when a burrow is found bisulphuret of carbon is injected into it and the burrow closed with putty or soap. We often find as many as a dozen or more borers, in the trunk and branches of a small elm or maple from four to six inches in diameter, and these are easily treated with the bisulphuret of carbon, which is sure death to any living thing in the burrow. I have also found it a most effectual remedy for the Apple Tree Borer, and all borers of fruit trees where the burrows can be found; they are often very prominently marked by the frass these borers eject from their burrows. Take a common oil

can with a spring bottom and the liquid can be forced from it, into the burrows without difficulty. I have used bisulphuret of carbon in various forms for insect destruction since 1885. It is most valuable in washes for scale insects also. Injecting bisulphuret of carbon into the burrows of insects is, I consider, one of the most important discoveries I have made for the destruction of wood-boring larvæ. In 1893 we spent three months collecting and destroying the larvæ of this insect, and last year showed the valuable effect of this thorough work in the decreased number working upon our trees.

The next most troublesome species of insects to us is the Tussock Moth (*Orgyia leucostigma*). I see that you have the same species abundant in your own city. For their destruction I have resorted to four methods. First, by hand-picking and by removing the cocoons with wire brushes. In this way barrels of the egg-masses are collected and then destroyed. Second, by jarring the larvæ down with a pole so arranged that a blow from a mallet on a projection at the larger end of the pole, will jar down any that may be on that limb, for they are easily dislodged by the concussion. Third, by poisoning the foliage with London purple, which is quite effective, especially on trees that have not been properly cleared from egg-masses during the winter. Fourth, by spraying the trunks of large trees that are covered with cocoons, with an emulsion of petroleum and crude carbolic acid. This emulsion, put on with a stiff spray, will penetrate most of the cocoons and destroy the pupæ or larvæ within, and many of the eggs that have been deposited on the outside of the cocoons. This last method is only resorted to, when from want of proper winter cleaning, the trees have been defoliated by these insects.

For the Elm Beetle (*Galeruca xanthomalœna*) we try to follow up preventive measures by spraying the trees with London purple, as soon as we find the first groups of eggs. This is usually from May 28 to June 6. This spraying is kept up at intervals of two or three weeks, until autumn. Another method which we are faithfully following is to kill all the pupæ we can find at the base of the tree or along walls and in any out of the way places. This, I think, is of the greatest importance, and all pupæ should be destroyed as fast as they show themselves. An emulsion of petroleum and carbolic acid is used, and this is sprayed into and over all places where the larvæ have crawled to pupate.

The Bag Worm (*Thyridopteryx ephemeræformis*) was at one time very destructive to our park trees, and is still, I am told, in some sections of the country. These can be readily removed with tools in the winter season, and the trees can also be sprayed for their destruction when in foliage. For Tent Caterpillars and others that feed in masses, as Vanessa, Datana, etc., the most effectual method is to remove the mass as soon as they are discovered. If they are very young, a single twig or even a leaf, will be all that it is necessary to take off; but if left till nearly full grown, they can be taken out by hand, or if on an unimportant branch, this may be cut away with the attached mass.

For scale insects, many of the emulsions so well known can be applied, and if a pliable steel brush is used in addition, the work can be made very complete, save on the smaller twigs, which can be sprayed with the emulsion as the best means of reaching the insects without destroying the smaller branches.

For Plant Lice (Aphides) one of the most effectual means is to break up the colonies with a stiff spray of water, for most of them have a gummy secretion that prevents the emulsion from acting upon them, but let the hose be played upon them for a moment, and they are in condition to receive the destructive agent.

For the Pine Chermes (*Chermes pinicorticis*) and the Maple Pulvinaria (*Pulvinaria innumerabilis*), I have for a long time been using the spray, and it is the most effectual means of cleaning a tree of these pests. With this spray one can knock down quantities of larvæ from the branches, and most effectual work could be done with a steam engine with the proper hose attachments in killing great quantities of insects besides keeping many of them in subjection. I would condemn the practice of boring holes into trees, with the idea that the preparation inserted is going to spread over the whole tree and thereby destroy all kinds of insects; that is a physical impossibility. We who have charge of plantations of trees are constantly beset by venders of remedies of all kinds that will kill everything but the trees. My advice is, do not waste time and money trying everything that is offered, but consult a physician who is making this a life work — and you have a number of the very best of these in your own state — and his conservative opinion, born of hard practical experience, will be the best advice to follow.

In treating our trees, shrubs, and plants for the destruction of insect foes, I would advise careful and persistent winter work, for when the trees are leafless is the best time to remove all cocoons, egg-masses, etc., from the limbs and trunks, and every dead leaf or bunch of leaves that is fastened to the limbs ought to be considered as harboring a mass of eggs or a pupa, and even if it does not it is safer to have it out of the way. Always make your winter work thorough and your summer trouble will be less. These preventive measures are always to be studied and practised. As you watch the expanding foliage, flowers, and fruits of your trees, watch also for their enemies. Learn to distinguish between friend and foe so as to be able to preserve the one and destroy the other.

DISCUSSION.

Professor Southwick displayed numerous charts, two by three feet in size, some having magnified figures of the noxious insects and fungi referred to in his paper, showing them at their different stages of development, that those present might be able to recognize the living specimens at sight.

Other charts showed various tools and the method of using them in the warfare against the many insect pests infesting the trees, shrubs, and plants in the several parks in the city of New York.

There was also quite an array of the smaller tools, among which were brushes of various forms and sizes, the brush material being steel wire of different degrees of firmness and elasticity. Some were suitable for brushing cocoons and egg-masses from the trunks and branches of rough-barked trees, while others were used on those with smooth, tender bark.

There were knives of different sizes and forms, of which the shoe knife was held to be the most useful; also gouges, chisels, mallets, saws of different styles, metal cans with spring bottoms, used to inject bisulphide of carbon into the burrows of wood-boring insects in trees and shrubs, and a variety of other implements for special purposes.

As Professor Southwick found nothing in the markets to serve his requirements, he invented apparatus to meet his need in particular lines of work.

This collection of charts excited considerable interest, and at the conclusion of the lecture, many of the audience came to the

platform to examine them more carefully. This led to conversation rather than discussion, but from which the following information was gleaned:

Twelve years ago when Professor Southwick assumed charge of the entomological work in the parks of New York City, large numbers of trees were defoliated by the Bag Worm (*Thyridopteryx ephemeræformis*). The trees looked as if a fire had swept through them, so completely were their leaves eaten by this insect. With his improved tools, made for this work, he collected nearly twenty-two bushels of these insects in one season and destroyed them. This method of dealing with them nearly extirpated the species and it has since been easy to keep them in subjection. This was done when the trees were leafless, and the insects' cases were easily seen. The Elm Leaf Beetle (*Galeruca xanthomelœna*) works on the leaves of the elm tree, the beetles eating round holes in the leaves and the larvæ consuming every vestige of the parenchyma. Professor Southwick said that in May and June he constantly watched the elm trees in the parks, and as soon as he saw the beetles or larvæ at work he immediately sprayed the parts affected, but did not attempt to spray the whole tree at that time. From the middle of May to October the trees were sprayed several times. The solution used was: London purple, one pound; flour, four or five quarts; lime, three pounds; and water, one hundred gallons. The flour is added to make the poison adhere to the foliage. The solution is sprayed on the under side of the leaves as much as possible, from a fine cyclone nozzle. This solution is carried from the force pump to the nozzle, through a quarter-inch orifice, rubber canvas insertion hose. The canvas makes the hose strong and light, so that when it is lashed to a light bamboo pole, the operator can hold up fifty or more feet of it without difficulty. Professor Southwick urged that the larvæ of the Elm Beetle should be destroyed when they come down the trunks of the trees to pupate at its base, as this would materially lessen the number of beetles for the next generation. In the case of large trees, the men climb into them, but if they are not over fifty feet in height, an extension pole is used to raise or lower the spray as is needed. These poles are fastened to each other with bands and are hoisted up and let down with a rope and pulley. The preparation used for destroying the larvæ and pupæ at the base of the tree is: Soap, six pounds; kerosene,

five quarts; carbolic acid, two or three quarts; and water, one gallon. This is boiled together and afterward mixed with one hundred gallons of water.

The Wood Leopard Moth (*Zeuzera pyrina*) was first noticed by him in the New York Parks in 1884, when the gardeners brought him a larva which they had taken from an elm limb. The female of this insect probably inserts an egg at the base of a leaf or node of the twig, and the young larvæ enter the twigs at that point. As it increases in size, it bores to the lower part of the branch, or leaves it and migrates to another branch or to the trunk. From a small maple three and one-half inches in diameter, Professor Southwick said he had taken thirty-two borers of this destructive insect, and that in the city parks they had already been found in over one hundred species of trees and shrubs. The remedy is to destroy all branches that are affected or broken off, as far as possible, and to inject bisulphide of carbon into their burrows, and putty up the hole. Their burrows can be easily found, as the borer throws out the frass and this can be seen at the base of the tree or on the trunk and limbs. Professor Southwick said, the great secret of success with spraying compounds and insect subjection is in preventive measures; that is, treating the affected plants before the insects have spread over the entire foliage, and following it up by repeated applications as the cases in hand required.

The Rose-chafer or Rose-bug (*Macrodactylus subspinosus*) is described by Dr. T. W. Harris, in his work on "Insects Injurious to Vegetation," as "one of the greatest scourges with which our gardens and nurseries have been afflicted." As it breeds below the surface of the earth, we have to deal with it only in its beetle form, and during a period of about forty days from the second week in June, each year. The most reliable methods of treating them are, first, by hand-picking into a dish containing kerosene, and, second, by jarring the tree, shrub, or vine upon which they are feeding; this frightens them and they instantly let go their hold on the plant and drop to the ground; but we can catch the falling insects upon cotton sheets (previously arranged under the plant like an inverted umbrella) and then kill them in kerosene. This should be done in the earlier hours of the morning when the beetles are less active, as during the warmer part of the day they will be quicker on the wing and escape.

Professor Southwick, in reply to a question, stated that they had no Gipsy Moths (*Ocneria dispar*) in New York City or vicinity.

A species of Sap-fly, supposed to be a Sciaria, has proved quite mischievous among the park trees of New York City. If a limb is cut off, it often happens that the scar is induced to bleed by the white worm-like larvæ of this dipterous insect, which are able to keep up the flow until cold weather. This sap, which becomes sour and of the consistency of thin jelly, runs down the trunks, rendering them very unsightly, and no doubt the trees are weakened by its continuous loss. These spots are conspicuous on several species of trees but the elm is the more often affected, and the wood, thus softened and exposed to the action of the atmosphere and to the spores of fungi, soon becomes a rotten spot in the tree unless the progress of decay is arrested. The remedy has been to spray the spots with a carbolic acid solution; then, when nearly dry, to brush the scar clean with a rice-root brush, dry off with plaster of Paris and apply paint or shellac (or liquid celluloid if the tree is a valuable one), after which there will be no more trouble. Incidentally, reference was made to fungous disorders or pests, and Professor Southwick remarked that there were a great many species working on the trees and shrubs, and that *Agaricus ulmarius* was conspicuously destructive; that a well-developed bunch of it was found upon a scar from which a limb has been removed only two weeks before. He added that the mycelium of the fungus penetrated the wood a long distance and soon destroyed its structure.

Being questioned as to the possibly fatal effect upon poultry from eating apples that have been sprayed with the London purple solution, Professor Southwick said that as the solution contained as much lime and as much flour as of the London purple, and should be put on in a spray as fine as mist, he doubted whether any harm would come to any poultry from the quantity of the fruit they would eat.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 23, 1895.

A Meeting for Lecture and Discussion was holden today at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair.

The following paper was read by the author:

EXPERIMENTAL EVOLUTION AMONGST PLANTS.

By Professor L. H. BAILEY, Cornell University, Ithaca, N. Y.

[Before entering upon the proper subject of the hour, the speaker made some introductory remarks concerning the present state of belief in the theory of evolution. A brief abstract of these remarks is here given.]

Every thoughtful person at the present day is an evolutionist, although he may not know it. Everyone now considers every movement, either of human society or of natural forces, in connection with its origin and gradual growth or development. A person may be an evolutionist without subscribing to any particular doctrine of the origin of species or to any particular dogma either of religion or science. Evolution in the abstract means merely a gradual unfolding or growth. In the organic world, the term is used to designate the belief in the origin of one form or one species from another. Its use does not necessarily imply that one believes in the origin of all things from one species or from many. It simply means that a person sees growth, development, and progression in nature.

There are two chief reasons for the belief in the evolution of animals and plants: first, the fact of struggle for existence; second, the fact that there are constantly recurring physical changes. The struggle for existence is the necessary result of the multiplication of species, and the physical changes necessitate a constant modification of the species in order that they may fit themselves into the environment.

There are five chief lines of proof of evolution: first, the record of the rocks, or palæontology; second, the fact that animals and plants are widely variable,—so much so that no two individuals in the world are exactly alike; third, we can see adaptive changes taking place, particularly among plants which are widely disseminated by man or which are brought under domestication; fourth,

the presence of missing links or breaks in the chain of life, which shows that those forms which are weakest, or least adapted to live, have dropped out and have left the others to strengthen themselves; and, fifth, the fact that there is a perfect adaptation of all organisms to their environments or conditions of life.

The doctrine of evolution is old, although it was not until the opening of the present century that it began to take on specific and technical form. It was taught more or less vaguely by the Greeks, and, later, by the Arabs. Perhaps it may be said that two chief epochs in the history of the unfolding of the doctrine are those represented by Copernicus and Darwin. Copernicus disproved the old geocentric doctrine, or the notion that the earth is the center of the universe; Darwin disproved the homocentric doctrine, or the notion that man is the central object of nature. We now conceive of the universe as a whole, undergoing a general progressive or onward movement in which all its parts are intimately concerned.

After these introductory remarks, Professor Bailey delivered his lecture as follows:

De Varigny has written a most suggestive book upon Experimental Evolution, in which he contends for the establishment of an institution where experiments can be definitely undertaken for the purpose of transforming a species into a new species. "In experimental transformism," he writes, "lies the only test which we can apply to the evolutionary theory. We must use all the methods we are acquainted with, and also those, yet unknown, which cannot fail to disclose themselves when we begin a thorough investigation of the matter, and do our utmost to bring about the transmutation of any species. We do not specially desire to transform any one species into another known at present; we wish to transform it into a new species. * * * Experimental transformism is what we need now, and therein lies the only method we can use."

This is a most commendable object, and I hope that the attempt will be made to create a new species before our very eyes. This is what most people demand, as a proof of evolution, and they are sometimes impatient that it has not been done; and it would seem, upon the face of it, that nothing more could be desired. When I reflect, however, upon the fact that this very thing has occurred time and again with the horticulturist, and then

consider that botanists and philosophers persist in refusing to see it, I am constrained to offer some suggestions upon De Varigny's excellent ambition. If I show a botanist a horticultural type of recent or even contemporaneous origin which I consider to be specifically distinct from its ancestors, he at once exclaims that it is not a species but a horticultural variety. If I ask him why, he replies, "Because it is an artificial production!" If I show him that the type is just as distinct from the species from which it sprung as that species is from its related species and that it reproduces its kind with just as much certainity, he still replies that, because it is a horticultural production, it cannot be a species. In what, then, does an accidental horticultural origin differ from any other origin? Simply in the fact that one takes place under the eye of man and the other occurs somewhere else! It is impossible at the present day to make a definition of a species which shall exclude many horticultural types, unless an arbitrary exception is made of them. The old definitions assumed that species are special creative acts, and the method of origin is therefore stated or implied in all of them. The definition itself, therefore, was essentially a statement of the impossibility of evolution. We have now revised our definitions so as to exclude the matter of origin, and thereby to allow free course to evolution studies; and yet here is a great class of natural objects which are practically eliminated from our consideration because, unhappily, we know whence they came! Or, to state the case differently, these types cannot be accepted as proofs of the transformation of species because we know certainly that they are the result of transformation!

Now, just this state of things would be sure to occur if De Varigny were to transform one species into another. People would say that the new form is not really a species, because it is the result of cultivation, domestication, and definite breeding by man. He could never hope to secure more remarkable transformations than have occurred a thousand times in the garden; and his scheme — so far as it applies to plants — is essentially that followed by all good gardeners. Or, if the prejudices of scientists respecting the so-called artificial production of species could be overcome, he could just as well draw his proofs of evolution from what has already been done with cultivated plants and domesticated animals as from similar results which might arise in the future from his independent efforts. I am not arguing

against the scheme to create a species before our eyes, but I am simply stating what has been and is the insurmountable difficulty in just this line of endeavor,— the inability of the experimenter to satisfy the scientific world that he has really produced a species; for it is a singular thing that whilst all biologists now agree in defining a species upon its tangible and present characters, they nevertheless act, for the most part, upon the old notion that a species must have its origin somewhere beyond the domain of exact history.

This notion that a species, to be a species, must have originated in nature's garden and not in man's, has been left over to us from the last generation,— it is the inheritance of an acquired character. John Ray, towards the close of the seventeenth century, appears to have been the first to use the word species in its technical natural-history sense, and the matter of origin was an important factor in his conception of what a species is. Linnæus's phrase is familiar: "We reckon as many species as there were forms created in the beginning." Darwin elaborated the new conception,— that a species is simply a congregation of individuals which are more like each other than they are like any other congregation, and with a freedom from prejudice which is rarely attained even by his most devoted adherents, he declared that "one new variety raised by man will be a more important and interesting subject for study, than one more species added to the infinitude of already recorded species." The old naturalists threw the origin of the species back beyond known causes; Darwin endeavored to discover the "Origin of Species," and it is significant that he set out without giving any definition of what a species is. I have said this much for the purpose of showing that it is important, when we demand that a new species be created as a proof of evolution, that we are ourselves open to conviction that the thing can be done.

I have said that no modern naturalist would define a species in such terms that some horticultural types could be excluded, even if he desired that they should be omitted. Haeckel's excellent definition admits many of them. In his view, the word species "serves as the common designation of all individual animals or plants, which are equal in all essential matters of form, and are only distinguished by quite subordinate characters." It is impossible, however, actually to determine whether one has a species in

hand by applying a definition. One must show that his new type — if it is a plant — has botanical characters as well marked as similar accepted species have, and these characters must show, as a whole, a general tendency towards permanency when the plant is normally propagated by seeds. He must measure his type by the rule of accepted botanical practice. If the same plant were found wild, so that all prejudice might be removed, would the botanist unhesitatingly describe it as a new species? If yes, then we should say that a new species had been created under the hand of man; and this rule I wish now to apply to a very few familiar plants. In doing so, I do not wish to be understood as saying that I consider it advisable to describe these plants as species under the existing methods of botanical description and nomenclature, for, merely as a matter of convenience and perspicuity, I do not; but I wish to show that they really are, in every essential character, just as much species as very many other universally accepted species are.

The evolution of forms which any botanist would at once designate as species, were he ignorant of their origin, is well illustrated in the tomato. Dunal, the accepted authority upon the genus Lycopersicum, admits ten unqualified species into his account in De Candolle's Prodromus. Two of these, *L. pyriforme* and *L. cerasiforme*, are generally regarded as mere forms of the common garden species, *L. esculentum*, both because they are very like the common tomato in botanical characters and because we know, as a matter of history and experiment, that all three of these reputed species are modifications of one type. Omitting these two species, then, there remain eight to which we cannot attach any such suspicion as a knowledge of their origin. These are what botanists call good species. These species agree in having a weak and spreading habit of growth, much like the common tomato. The features by which they differ amongst themselves, that is, the specific characters, are founded chiefly upon the manner of division of the leaves, the shape of the leaflets, the character of the flower cluster, and the relative hairiness or smoothness of the parts. If one applies these same tests in the same degree, to the two modern offshoots of the tomato — the Upright and the Mikado types — he will find that these offshoots differ as much or even more from each other and from their own common parent, than any one of the wild species differs from any

other species; and everyone knows that these characters come true from seed. The Upright type differs from all other tomatoes in its stiff and self-sustaining habit of growth, a character which belongs to Solanum rather than to Lycopersicum; and this habit is so marked that persons unfamiliar with the variety usually think the plants potatoes rather than tomatoes, when the fruit is not seen. The entire foliage of the plant is so distinct that the most casual botanist could draw botanical characters from it to separate the plant specifically from any other species of Lycopersicum which is yet described. The leaflets are reduced in number and are greatly modified in shape. Even the inflorescence shares in the transformation, for the flowers, instead of being six or more as they are in its known ancestors, are reduced to two or three. If De Varigny were to experiment for centuries, he could scarcely expect to produce any "new species" which should have better characters than this singular race of tomatoes, the origin of which is so well known that we have the record of the year in which it originated, and the very man who sowed the seed from which it sprung. This curious race came in suddenly, without any premonition, so far as we know, of its appearing, and the same thing has probably not originated a second time.

The other type to which I referred, the large-leaved or Mikado race, gave evidence of its coming. This type has a most remarkable divergence from the species in the most fundamental botanical characters of its leaves. The leaflets are much fewer than in the common tomatoes, very large, the lower side strongly decurrent on the stem, the margins entire, and the blades plane or flat,—characters which are as far removed from *Lycopersicum esculentum*, from which it came, as the characters of the latter are from other recognized species. In young plants, the leaves are even entire, a character which is supposed to be foreign to the genus. The tendency towards this large-leaved type was noticed many years ago in the old Keyes's Prolific tomato, but it appeared to have first attracted much attention in Nisbit's Victoria, a variety which came from seed of Hathaway's Excelsior, which has foliage very small, curled, and much divided. In very recent years, it has appeared again in a most emphatic form in the Mikado or Turner Hybrid, and in the Potato Leaf. We have a good indication of how distinct these two races of tomatoes are from the fact that we have a real species — that is, one which has no genealogy — in

cultivation, besides *Lycopersicum esculentum*, and it is not regarded by horticulturists as worthy such explicit description or separation from the common type of tomatoes as either the Upright or the Mikado type is. In fact, gardeners do not look upon it as a distinct species at all, although it is universally received by botanists, and Vilmorin even places it in the genus Solanum. This is the Currant tomato, or *L. pimpinellifolium*.

But the most remarkable feature of the evolution of the tomato, to my mind, is one which appears to have escaped scientific comment. It is the fact that, in America at least, the whole body of garden forms is rapidly progressing or departing from the original type. This original type, or something very like it, was the only tomato at the opening of the century, and it was essentially that which the older men of the present generation knew in their boyhood. The plant was comparatively small, with an erect or upright tendency of the young shoots, with foliage light in color and small and either thin or much curled, the leaflets tending somewhat to rounded forms, the flowers two-ranked in long and sometimes forking clusters, the fruit, in the simplest forms, strictly two-celled, and in the most developed forms flat on the top and bottom and corrugated or ridged on the sides. Now all this is changed, and there is only an occasional variety, or the persistent Cherry Tomato, which recalls the old type. At present, the tomato plant is large and widely spreading, with scarcely an indication of the spire-like growths of the young shoots which characterized the old forms, with foliage very dark green and large and the leaflets thick and flat and tending to pointed and jagged forms, the flowers reduced to irregular clusters of two to four, the fruit very many-celled, and, under the influence of recent selection, regularly rounded on top and apple-shaped. For nearly a century, the tomato has been steadily moving forward into this new form, with all its botanical characters profoundly modified; and it holds this form as uniformly when propagated from seeds as any wild species could be expected to do. If, as Haeckel declares, a species is a succession of organisms which exhibit the same form under the same environments, then even the common type of tomatoes might contend for specific distinction from their ancestors of a century ago. At all events, we have here as profound, onward, definite, transformation as De Varigny could hope to secure in the same length of time; and if

such productions as these of which I have spoken are not to be accepted as species, why should we accept those which we assume would arise under the care of an evolution experiment station? Here we have absolutely new and unique types, as De Varigny demands, and they are as distinct from each other and from their parents, in accepted botanical characters, as "good species" in the same genus are from each other, and they perpetuate these characters as unequivocally as those species do. Moreover, we know definitely what their origins were, and they therefore answer all the purposes of experimental evolution.

Similar observations respecting the evolution of forms of specific importance, could be made for most species of plants which have been widely cultivated for a considerable length of time. The case is singularly well illustrated in Indian corn. Maize has been very uniformly accepted as a single species by botanists. This arises mostly from the fact that corn is nowhere known truly wild, and has therefore attracted little attention from systematic botanists. There are some authors, however, who have made species of some of the marked cultivated types, either upon the hypothesis that these forms must have been derived from distinct wild types, or that, independently of origin, they merit specific recognition. The chief author who takes the latter view is Sturtevant, who, whilst accepting the common origin of all types of maize, nevertheless prefers to recognize seven "agricultural species," as follows: *Zea tunicata*, "a primitive form" from which the other six are derived,—*Zea everta*, pop corns; *Z. indurata*, flint corns; *Z. indentata*, dent corns; *Z. amylacea*, soft corns; *Z. saccharata*, sweet corns; and *Z. amyleasaccharata*, the starchy-sweet corns. Whilst these species are not accepted by the regular botanists, there can be no doubt that some of them would be regarded as distinct species if they should turn up in an evidently wild state; and a proof of this statement is found in Watson's *Zea canina*, which was founded upon wild corn collected in southern Mexico. Now Mr. Watson was one of our most conservative American botanists, and any new species which he should describe could be depended upon to have good botanical characters; yet this new *Zea canina* is so like our rice pop corns that Sturtevant unhesitatingly refers it to his *Zea everta*, thus showing that it is not more unlike ordinary corn than some types of pop corn are! Moreover, this corn is found to lose quickly

the very botanical characters upon which the species is founded, when it is brought into cultivation. Even in its wild state it is scarcely more distinct from the common races of maize than the "husk corn" is, or the curious striped-leaved corn of Japan,— and the latter would certainly be considered worthy of specific recognition by botanists were it not for the fact that historical evidence shows that maize was introduced into Japan directly or indirectly from the New World, and that, therefore, its origin is more or less enshrouded in knowledge! All this is but another illustration of how tenaciously botanists still hold to the Linnæan idea of species, whilst they profess the Darwinian idea.

A similar evolution of types which are as distinct and permanent as accepted species in the same genus, is well illustrated in the various beans. The common garden or kidney bean was made into two species by Linnæus, the pole beans (*Phaseolus vulgaris*) and the bush beans (*P. nanus*). Since it has been demonstrated by experience and experiment, that these groups are interchangeable forms of one type, botanists have discarded Linnæus's designations of them and now call the garden bean a single species; yet it should be said that a more explicit and satisfactory instance of the evolution of specific forms right under our own observation could not be demanded. The two groups are species until we discover that they have sprung from one type within historic times, whereupon we then regard them not as species but as anomalies of cultivation. Von Martens, however, discards origin as a mark of specific likeness or difference, and now proposes to erect seven species upon the obvious racial differences in the garden beans. But the most interesting feature of this bean botany is the complete neglect, on the part of botanists, of the singular dwarf Limas, which have appeared in very recent years. Remember, now, that Linnæus regarded the common pole beans and the common bush beans as two distinct species, because one is a running or twining plant and the other is a dwarf erect plant. The Lima bean is a twining plant; but within the last few years three well-marked types of true bush beans have sprung independently from the old types of Lima. If these differences were worth specific recognition in the common garden beans, why are not the same differences worth at least a passing comment in the Lima bean? Yet, because these types have originated before our eyes, botanists consider them not worth

notice, although, at the same moment, they are hoping for the time when they shall see the origination of a new species of plant! But this curious bean evolution has not stopped here. The old Scarlet Runner and White Dutch Runner of our gardens (*Phaseolus multiflorus*) have well marked botanical characters in the leaves, inflorescence, pods, beans, and particularly in the roots, which are fleshy and perennial, and in the very tall twining habit. Yet, at the moment when dwarf forms had sprung off the Lima stock — in the same way as the common bush beans undoubtedly had sprung off the stock of the common pole bean before Linnæus's time — a bush bean sprung off the stock of the old White Dutch Runner, and this is known in commerce as Barteldes's Bush Lima. But this singular bean has other characters than the very dwarf complete bush habit, to distinguish it from its parent, for it differs in a smaller inflorescence, in foliage, and particularly in a remarkable tendency towards a fibrous annual root. Here is a new form which surely ought to satisfy any person who demands the direct origination of a new species, as a proof of evolution.

There are other curiosities amongst the beans. Gardeners know two well-marked types or races of the Lima bean, the Sieva type and the Large Lima type. There are good and valid botanical distinctions between the two, which were amply recognized by Linnæus, who, supposing that one came from Bengal and the other from Africa, made species of them. The smaller, or what we now know as the Sieva type, he called *Phaseolus lunatus;* the other he called *P. inamœnus.* The term Lima bean, which all agree in associating with *Phaseolus lunatus*, should properly be applied, therefore, to the Sieva type. For a century these species of Linnæus were generally considered to be good,— that is, distinct and valid. It is now pretty well established that both these beans came from Brazil. Only one of them is known in a truly wild state, and the suspicion is so strong, therefore, that the other sprung off from it under cultivation, that the two types are now united as one species. Still a third well-marked type, differing in shape and texture of leaflets, and characters of pods and seeds, has now originated from the Large Lima type; this is the Potato Lima type. It should also be said that Macfadyen, in his flora of Jamaica, made four new species out of the Lima type of beans. Here, then, are three groups of beans, each

as distinct from the others and from its ancestors as accepted species of Phaseolus are from each other, yet, because of their origin under domestication, they are debarred specific distinction. Now, a most curious thing about these dwarf Lima beans, which have appeared so suddenly in the past few years, is that they have come from each of these three types,— Henderson's from the Sieva type, Thorburn's or Dreer's from the Potato Lima type, and Burpee's from the Large Lima type,— thus showing that each of these types or races is developing along independent but parallel lines; and these lines are also identical with the method of evolution which was early assumed by the common garden bean and with the departure which has just now appeared in the old White Dutch Runner.

The Soy bean, now coming into popular cultivation in the South, affords a most striking example of the evolution of a new species, and one, moreover, which is accepted by careful botanists. This plant is unknown wild, and there is every reason to consider it to be a modified form of the wild *Glycine Soja* of China and Japan; but its botanical characters are so unlike those of its ancestral household that Maximowicz — a most conservative botanist — describes it outright as a new species, *Glycine hispida*.

I have now brought to your attention a few familiar plants for the purpose of showing that what are, to all intents and purposes, good species have originated in recent years; and that, whilst botanists demand that the origination of species within historic times shall constitute the only indisputable proof of organic evolution, they nevertheless refuse to accept as species those forms which have thus originated and which answer every demand of their definitions and practice. The proofs of the evolution of species, drawn from the accepted practice of the best botanists themselves, could be indefinitely extended. We need only recall the botanical confusion in which most cultivated plants now lie, to find abundant proof of the evolution of hundreds of types, so distinct that the best botanists have considered them to be species; but other botanists, basing their estimate of species upon origins, have reduced them or reincluded them into the form or type first described. Consider the number of species which have been made in the genus Citrus, comprising the various oranges, lemons, limes, and the like. Recall the roses. The Moss rose and others would be regarded as distinct species by any botanist

if they were found wild and if they held their characters as tenaciously as they do under cultivation. In fact, the Moss rose was long regarded as a good species, and it was only when its origin began to be understood that this opinion was given up. The earlier botanists, who were less critical about origins than the present botanists are, made species largely upon apparent features of plants, although their fundamental conception of a species was one which was created as we find it, in the beginning. Yet, strangely enough, we at the present day, who profess to regard species as nothing more than loose and conventional aggregations of similar individuals, and which we conceive to have sprung from a common ancestor at some more or less late epoch in the world's history, make our species upon premises which we deny, by giving greater weight to obscurity of origin than we do to similarities of individuals.

The fact is that the practice of systematic or descriptive botany is at variance with the teachings of evolution. Every naturalist now knows that Nature does not set out to make species. She makes a multitude of forms which we, merely for purposes of convenience in classifying our knowledge of them, combine into more or less marked aggregations to which we have given the name species. Very often we find in Nature an aggregation of successive individuals which is so well marked and set off from its associated groups that we consider Nature to have made an out and out distinct species; but a closer acquaintance with such species shows that, in many cases, the intermediate or outlying forms have been lost and that the type which we now know is the remainder in a continuous problem of subtraction. In other cases, a form appears to have arisen without intermediate forms, as a distinct offshoot from an older type. This is well illustrated in many remarkably distinct garden forms, which originated all at once with characters new to the species or even to the genus. I have mentioned such a case in the Upright tomato. Even the sudden appearance of these strange forms is proof that species may originate at any time and that it can be no part of our fundamental conception of a species that it shall have originated in some remote epoch. Species-making forever enforces the idea of the distinctness and immutability of organic forms, but study of organisms themselves forever enforces an opposite conception.

The intermediate and variable forms are perplexities to one who attempts to describe species as so many entities which have distinct and personal attributes. So the garden has always been the bugbear of the botanist. Even our lamented Asa Gray declared that the modern garden roses were "too much mixed by crossing and changed by variation to be subjects of botanical study." He meant to say that the roses are too much modified to allow of species-making. The despair of systematic botanists is the proof of evolution!

I repeat that mere species-making, in the old or conventional sense, is an incubus to the study of nature. One who now describes a species should feel that he is simply describing a variable and plastic group of individuals for mere convenience's sake. He should not attempt to draw the boundary lines hard and fast, nor should he be annoyed if he is obliged to modify his description every year. This loose group may contain some forms which seem to be aberrant to the idea which he has in mind; and it would seem as if he should be ready to call them new or distinct species whenever, from whatever cause, they become so much modified that it is convenient, for purposes of identification and description, to separate them from the general type. Just as soon as botanists come to feel that all so-called species of plants are transitory and artificial groups, maintained for convenience in the study of Nature, they will not ask whether they are modified outside the garden or inside it, but will consider groups of equal distinctness and permanence to be of equal value in the classification of knowledge, wholly aside from the mere place of their origin. At the present time, the garden fence is the only distinction between many accepted species and many disregarded ones. The cultivation of man differs from the methods of nature only in degree, not in kind; and if man secures results sooner than nature does it is only another and indubitable proof of the evolution of organic forms. It is certainly a wholly unscientific attitude to demand that forms originating by one of nature's methods are species, while similar forms originating by another method are beneath notice.

If species are not original entities in nature, then it is useless to quarrel over the origination of them by experiment. All we want to know, as a proof of evolution, is whether plants and animals can become profoundly modified under different conditions, and if these modifications tend to persist. Every man before me

knows, as a matter of common observation and practice, that this is true of plants. He knows that varieties with the most marked features are passing before him like a moving panorama. He knows that nearly every plant which has been long cultivated, has become so profoundly and irrevocably modified that people are disputing as to what wild species it came from. Consider that we cannot certainly identify the original species of the apple, peach, plum, cherry, orange, lemon, wine grape, sweet potato, Indian corn, melon, bean, pumpkin, wheat, chrysanthemum, and nearly or quite a hundred other common cultivated plants. It is immaterial whether they are called species or varieties. They are new forms. Some of them are so distinct that they have been made the types of genera. Here is the experiment to prove that evolution is true, worked out upon a scale and with a definiteness of detail which the boldest experimenter could not hope to attain, were he to live a thousand years. The horticulturist is the only man in the world whose distinct business and profession is evolution. He, of all other men, has the experimental proof that species come and go.

Discussion.

Rev. Calvin Terry said that a minister once announced to his congregation, and advertised in the local papers, that he would preach on evolution. His people expected to hear a scientific discussion of the subject. But the preacher started with a living man in view, and confined his remarks to showing the possibility, the need, and the duty of everyone to strive to become a better man, or a better woman,—every Christian to become a better Christian. The preacher's evolution meant, simply growing in grace. A negro preacher undertook to give an account of the creation of man. He said, in dramatic style: "God wet de clay, and formed de man, and set him up ag'in' de fence to dry." One of the congregation, having more sense than the preacher, interrupted him and said: "But massa, who put dat fence dar?" Some, who call themselves scientific evolutionists maintain that somehow things make themselves, and that all existing organisms have been developed from some very low substance called protoplasm. Ever, in science, common sense requires us to believe that we must have something to begin with. We cannot undertake to say that things have come into being without a Creator,—a self-existing, eternal cause. These philosophers sound the deep

sea and draw up mud, and with microscopic eyes examine it, to find something which has the elements of life. But where did that first thing come from! How came it to possess this element of life, with the power to grow — by a long process, and the survival of the fittest — into a Daniel Webster? Everything must be furnished by Creative power, with those elements to be developed. Whatever our theories, we cannot account for the existing organisms without the Creative act of an Infinite, Almighty, and Eternal power.

F. L. Temple said that scientific botanists claim that a species can maintain itself and has done so from the beginning. On the other hand, varieties, so far as we know, cannot endure in competition with original species, therefore they should not be called species.

Professor Bailey responded that seemingly Mr. Temple had brought up a good point; but it is a mere assumption that a wild form, even though it be termed a species, can and will maintain itself. We know that a wild bitter orange exists in Florida; that two forms of wild apples are known in Europe; yet it is known that the latter are not original species, but varieties which persist, the same as species are assumed to do.

A lady said she understood from Professor Bailey's lecture that he did not distinguish creation from development.

Professor Bailey replied, citing Dawson's belief in successive points of creation; and added that the question of ultimate origin of any created thing has no necessary connection with evolution. Creation and evolution are entirely distinct. "In the beginning, God," is the way creation appears to his mind.

William D. Philbrick moved a vote of thanks to Professor Bailey for his able and instructive lecture, and it was unanimously passed.

BUSINESS MEETING.

SATURDAY, March 2, 1895.

An adjourned meeting of the Society was holden at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair.

Ex-President William H. Spooner, read a circular asking contributions to a Memorial to Francis Parkman, late President of

the Society, to be erected in the garden he created, and by the shores of the lake he loved so well, both now destined to become a part of the Public Park system of his native city. The circular was signed by Martin Brimmer, Leverett Saltonstall, Henry L. Higginson, Charles S. Sargent, and Lorin F. Deland, Committee.

O. B. Hadwen announced the decease of John J. Thomas, of Union Springs, N. Y., an Honorary Member of the Society, and moved the appointment of a committee to prepare a memorial of him. The motion was carried and the Chair appointed as that Committee, William C. Strong, O. B. Hadwen, and Robert Manning.

The President made the official announcement of the death of Francis Brown Hayes, one of the largest and most constant contributors to the exhibitions of the Society. On motion, the Chair appointed Francis H. Appleton, Arthur H. Fewkes, and William H. Spooner, a Committee to prepare a memorial of Mr. Hayes.

The following named persons having been recommended by the Executive Committee, for membership in the Society, were on ballot duly elected:

GEORGE FRED. HARWOOD, of Newton,
AMOR L. HOLLINGSWORTH, of Milton,
WILLIAM BOWEN MURPHY, of Boston.

The meeting was then dissolved.

MEETING FOR LECTURE AND DISCUSSION.

The following paper was read by the author.

A TALK ON GARDENS.

By DAVID HILL COOLIDGE, JR., Boston.

The origin of gardening arose from necessity, and as necessities increased, desires became greater, more luxurious, and more refined. Thus the Garden developed from an enclosure of a few square feet, to the noble English Park, miles in circumference, its boundaries lost in forest scenery, a gorgeous palace with architectural terraces placed in its centre, and the surrounding grounds ornamented by lakes, rivers, and pleasure grounds, varied with

bowling greens, plantations, flower gardens, hot-houses, orchards, vegetable gardens, and in fact, with all the beauties and gifts of Nature, so useful and necessary to mankind.

From these different objects have arisen the different branches of gardening; and as communication extended over the world, new plants were introduced from every quarter of the globe; fruits and vegetables were improved by selection and various processes of culture. Books were written; societies were established with prizes for individual merit, so that today a vast and voluminous mass of knowledge has been accumulated on the subject of Gardening.

Among these several branches I shall touch upon only one, namely, that of ornamental gardening.

Three important factors have influenced gardens to a marked degree. First, the different nations which have successively flourished in different parts of the world; second, the different forms of government which have prevailed from time to time; and third, the different climates and situations.

Of the gardens of antiquity the first one we hear mention of is that of Genesis, Eden, an enclosed garden or Paradise, in which, according to Scripture, our first parents were placed. The oldest historians represent it as a place of remarkable beauty—each according to his own light and all unreliable. In the same doubtful state is the site of this beautiful garden. The inhabitants of Ceylon, however, seem to have settled it to suit their minds, as they to this day point out Adam's bridge and Abel's tomb; also the tree which bore the forbidden fruit (the *Tabernæmontana alternifolia*), noted for its sweet-scented flowers and the beauty of its fruit, the shape of which gives the idea of a piece having been bitten out of it. The inhabitants say that it was delicious before Eve ate of it, but now it is poisonous.

The Gardens of the Hesperides have been described by a geographer of the sixth century B. C., as situated in a deep basin, with steep sides. They were closely planted with various kinds of trees, among which were the tree of the golden apple — supposed to be the orange — pomegranates, mulberries, olives, almonds, together with arbutus, myrtle, bay, and ivy. But the wonders of these gardens somewhat diminish when facts show that they were nothing more than old stone quarries, which still remain; their bottoms covered with excellent soil in which are planted various shrubs and luxuriant fruit trees.

The garden of Alcinoüs, the Eastern king of ancient times, was situated on the island of Capri. It was placed in front of the palace and was about four acres in extent. The first hedge mentioned in history surrounded this garden, which contained three or four sorts of fruit trees, borders of flowers, and beds of vegetables, while two fountains furnished water in an ornamental manner.

Of the gardens of ancient times those of Babylon were the most remarkable. These were built about 2000 B. C. and were considered one of the wonders of the world. They were four hundred feet square and rose with terraces, one above the other, in the form of steps, supported by stone pillars, to a height of three hundred feet, the top terrace being much smaller than the base. Vast stone beams placed on top of columns held up the terraces. The beams were covered by reeds, cemented with bitumen, upon which were placed a double row of bricks laid in cement. The bricks were covered with lead sheathing to hold in the moisture, and upon this was filled in sufficient earth for the growth of plants. Various kinds of trees were planted in rows along the sides of the terraces, thus giving, at a distance, the effect of a completely wooded hill. The river Euphrates supplied water to these gardens. This was raised and introduced into fountains by machinery. The different terraces contained fountains, parterres, seats, and banqueting rooms. These gardens offered all the splendor and luxury of Eastern magnificence, combined with the more peaceful enjoyment of natural scenery.

The Persian kings were very fond of gardens, which were laid out in quadrangles, with long parallel walks, planted with shade trees set in lines and regular figures. The margins of the walks were planted with tufts of roses, violets, and other sweet smelling flowers of low growth, while interspersed between the trees was every kind of flowering shrub. Formal canals ran parallel to the avenues and generally terminated in a large basin, octagonal in shape and ornamented with sparkling fountains. A tower, from the top of which one had a grand view of the garden, was generally placed in one corner.

These few examples are sufficient to give the general idea of the ancient garden and in looking back upon this period we see that gardening was one of the first necessities, and may claim priority

to every other art. The style was naturally formal, nor does it seem so strange that this method should have been adopted, when one considers that picturesque beauty or other poetical associations with natural scenery as an art of imagination, is one of the very last to have been brought toward perfection.

The second epoch of the art of gardening is from the time of the Roman kings, in the sixth century B. C., till the fall of the empire in the fifth century of our era. Italy furnishes us with the best examples.

In general it will be found that the Romans copied their gardening indirectly from the Persians, and that gardening, like other arts, extended with civilization from east to west.

The first garden mentioned in Roman history is that of Tarquinius Superbus, who lived about 534 B. C. This garden adjoined the royal palace at Rome, and abounded with flowers,— chiefly roses, lilies, and poppies. A formal stream of water is the only other feature mentioned.

The grandest gardens in the century of our Saviour were those of Lucullus, who, influenced by his travels in the East, had contracted a taste for its magnificence and pomposity. He had several villas in the different parts of Italy, so that by moving from one to another according to the season he had a very agreeable time the year round. There still remain near Baiæ, in the Bay of Naples, the traces of one of these villas, which, with its terraced gardens, was situated on an elevated, artificial structure, built out into the sea. The palace and gardens were surrounded by sea water, introduced by subterranean passages from without. From the buildings, gardens, and artificial mountains a most extensive panorama was obtained. It is to the folly and extravagance of Lucullus that mankind is indebted for the introduction of the cherry, peach, and apricot from the East.

Up to the time of Cicero, who died in 43 B. C., an occasional reference had been made to a more natural style of planting than the universal formal method. But Cicero himself combined a variety of natural beauties at his villa. He speaks of groves he had formed there; of the natural streams that passed through them from the surrounding hills; and especially of the absence of all appearance of art, and of all false ornament. Many passages have been left to us by other Roman poets and philosophers, full of the most beautiful descriptions of natural scenery; but this was

seldom carried into the garden, which was treated as a manifest work of art, and it was from this point of view that it was regarded. The garden was laid out with straight lines, and basins of water interspersed with masterpieces of sculpture. A flower garden placed near the terraces generally contained a fountain in the centre. The walks were bordered with box and the trees trimmed and sheared into the forms of birds and animals and other most fantastic shapes as well. Alcoves and summer houses offered places for repose. For planting, the plane tree was much used for shade, while the ivy, acanthus, myrtle, narcissus, and roses were generally found in the more ornamental parts. The myrtle and the bay were held in high esteem for their odors, and the mixture of sweet smelling trees became a point of study. Open groves were of frequent occurrence and they seem to have been the only sort of plantations of forest trees then in use. These were clipped, while the method of planting was that of the quincunx.

At the decline of the Roman Empire, gardening came to a standstill. Through the dark ages the peace and quiet of the world were so disturbed by invasions and all kinds of barbarism, that the more peaceful occupations were abandoned for those of war. Many of the gardens were entirely destroyed, and the taste for a quiet life became almost extinct.

From the end of the eighth to the twelfth century, the monks were the only class in Europe who occupied themselves in agriculture, and it is to them that we are indebted for the preservation of the arts of culture.

With the art of printing, about 1440, came the revival of mental light, and the blessings of peace and commerce, and with the revival of other arts came that of gardening.

The great family of Medici, at Florence, were the principal patrons, and the most celebrated gardens of the beginning of the sixteenth century were those of Lorenzo di Medici. The style was simply that of the past, with the usual alleys of clipped trees, trimmed hedges, fountains, cascades, statues, and topiary work. Such is the Italian style seen today, and one cannot help being impressed by the complete harmony of the house with the grounds, accomplished by the architectural treatment and decorations of the steps, and by the building of terraces and balustrades. The natural style of gardening has never made much progress in Italy, as the Italian mind does not seem to enjoy the charms of a

quiet, country life, or to be greatly influenced by the beauties of Nature.

The formal style was in vogue up to the eighteenth century, in all civilized countries where royal gardens were built. The general plans seem to have been closely allied, but influenced by natural conditions. The most noted example of this style is the gardens of Versailles, built in the time of Louis XIV, under the landscape architect, Le Nôtre. A short description of some of its principal features will give an idea of the whole.

Versailles was built in an age of pomp, display, and vanity, and Le Nôtre seems to have been just the man to sink the extraordinary sum of forty millions of dollars into these gardens. Hardly a style of gardening suitable for the American public at the present time!

As we pass through the palace and take a first look at these gardens, one is impressed by the enormous gravel terraces, which in warm weather the radiation of the sun renders almost impossible to walk upon with any comfort.

There is a central vista which carries the eye for miles into the country beyond, enhanced by means of a formal water basin, a "*tapis vert*," and a long canal-shaped stretch of water. The whole is framed by groves of clipped trees, which save the vista from utter tameness and soften the lines of crude formality. The grounds, on either side of this main vista, are divided into many gardens, some of which are very pleasing with their box edging, clipped yews, and statues, effectively standing against a background of horse-chestnut trees.

The flower borders, typical of the French method, are a combination of ribbon and mixed planting. Along the centre of the borders are lines of permanent, high-growing plants, such as standard roses, small Persian lilacs, etc. These are kept in neat, round heads, and in no way injure the bedding plants. This green line is very effective and saves the border from monotony and over coloring. Around each standard are rings of bedding plants — fuchsias, veronicas, and the like — and between these rings are other plants. On the outside of the border run low-growing plants in straight lines, each of which forms a continuous, separate color; the whole effect is very good.

The *tapis vert*, a large, long, turf avenue, is a delightful place to walk, sheltered by trees and adorned with rows of costly statues and vases.

There is an enormous orangery adjoining the palace, built in the face of the terrace. The collection of orange trees planted in tubs is very great, and the expense is in proportion to the number. The effect does not warrant the cost, for they are only placed out of doors, on the terraces and around the grounds, for about five months during the year. They never bloom, consequently they are never seen with their golden fruit hanging upon their branches.

One of the most pleasing gardens is that of the Bosquet du Roi, near the orangery. It is pleasing because the dreary, decaying formality, so universal throughout the grounds, is here wanting, and in its place we have a most restful piece of turf, surrounded with handsome trees with a few neat flower beds appropriately placed, a small sheet of water, and a few fine foliaged plants scattered about.

The colonnade, a grand example of architectural gardening, consists of thirty-two marble columns, varying in color, forming a circle. Beneath each arch is a marble basin supporting a *jet d'eau*, while in the centre of the open space is a large statue of the Rape of Proserpine. The whole is set off very well, as the structure is placed amidst a thick grove of trees.

The statues and fountains at Versailles are innumerable, the most important of the latter being that of the basin of Neptune. As it costs about two thousand dollars every time it plays, it is very seldom one has the pleasure of seeing it in full effect.

The gardens of Versailles do not belong to the present age, and one feels that they are echoes of the past. To judge the gardens from an artistic standpoint, we must look back and remember they were built for the vain and flippant court, and were used as an out-of-doors ballroom. Their elegance, formality, and pompous display, were in harmony with their use, as shown by the following short description of a fête given by Louis XIV:

"The entertainment was continued for several succeeding days, and supplied materials for an illuminated folio, officially published soon afterwards by the court printer. All the gardens, throughout their whole extent, were illuminated from sunset to sunrise by lights emitted from transparent vases. The branches of the trees were clipped so as to represent different orders of architecture, and musicians in the garb of shepherds, were perched everywhere among the boughs, playing sylvan pipes, flutes, and violins innumerable. Tables were loaded with the most sumptuous banquets.

"Chinese fireworks detained a splendid twilight in the firmament, while the atmosphere was odoriferous with the perpetual splash of scented fountains. Masks and dances alternately ministered to the amusement of the court, among whom the sovereign himself was conspicuous by his silver armor, studded with a profusion of diamonds, and the fire-colored plumes that nodded in his helmet."

It is certainly a great relief to mind and eye to go from these gardens to that of the Petit Trianon, the favorite place of Marie Antoinette, to which she and her chosen friends used to fly from pomp and formality, to enjoy the peace and repose of green fields, verdant glades, and the delicious coolness of naturally grown shade trees. She built there a picturesque little dairy on the margin of a natural flowing stream. The whole effect is one of perfect peace and quiet, in which the lover of Nature takes such delight.

The style of Le Nôtre prevailed throughout England, and he was called upon to make designs for many of the royal gardens of the palaces. As time went on, however, people began to think for themselves, and the influence of fashion to give way to native feeling, and general reasoning.

Milton is generally considered the prophet of natural gardening. In his Paradise Lost, published in 1667, there is a charming description of a picturesque garden. This led to writings by Addison and Pope, which so stirred the public mind that a revolution in favor of a more natural style of gardening was started.

William Kent, a young artist of Yorkshire, realizing the beautiful descriptions of the poets, began in 1730 important innovations. The most conspicuous were the destruction of the walls as boundaries, and the introduction of sunken walls or ha-has, as they were called. These did much to harmonize the lawn and park. Kent was the gentleman who, as the saying goes, "Peeped over the wall and found all Nature was a garden."

Brown followed Kent. He acquired a very great reputation, which reached its height when, by constructing a dam at Blenheim, he produced in a week, a grand artificial lake, the largest at that time in the world. Improvement was the fashion of the day, filling Brown's pockets to overflowing. His work, however, was characterless. He treated all places practically the same, whatever the extent or character of the surface, always surrounding them by a narrow belt of trees, while the intermediate space was

broken up by various circular or oval clumps of trees. A serpentine stream was introduced when possible, perfectly uninteresting from the lack of appropriate planting. So stereotyped had the art become that any one might have guessed what would be the plan given by "Capability Brown," as he was nicknamed, and in fact there was an instance in which this was done.

The monotonous productions of this systematic style soon fell into bad repute, and a desire for a purer taste began to be expressed by intelligent writers, who had much influence on the public mind. Among these was Gilpin. His works were largely read. The beauties of landscape, the effect of light and shade, the grouping and outline of trees, and a thousand and one other attributes of picturesque scenery were for the first time placed before the public in a charming and comprehensive form. His works were published between 1770 and 1790.

Other able writers have left us good works which aim at a purer and a more naturalistic style of gardening; among these are Price, Knight, and Repton.

The tendency of these discussions was to refine the taste and make it more liberal, the outcome of which is the modern style of today, which in general terms may be called one of harmony, in which the beauties of the formal style are often skillfully blended with those of the natural, when necessity so dictates.

And now let us turn our eyes homeward from foreign countries, whose governments and conditions are so different from ours.

America is a country of independent homes, and the laws of inheritance are such that it is almost impossible for large estates to remain long undivided; consequently it is comparatively rare that enormous sums of money are expended on large private gardens. Such sums are rightly spent for the good of the public on our noble park systems, which in the last twenty years have made such grand development that they rank among the first in the world.

I had the pleasure, a few years ago, of showing the President of the London County Council,— Lord Meath, who has done so much to open to the public breathing spaces in the crowded districts of London,— our parks and gardens. His praise was unstinted as we examined the Charlesbank, the Common, and Back Bay Fens, but as we drove on through our beautiful suburbs

and parks, he became less talkative, but was evidently thinking deeply. As we were nearing home he suddenly burst out with the exclamation, "I am perfectly astounded; I had no conception that such work was going on in this country. Well may the citizens of Boston be proud of their beautiful city." And when he went back to his smoky London, and published a little report of what he had seen in America, the parks of Boston were the most highly spoken of. It was good praise, from a source that knew. I speak of this to show to what perfection the art of Landscape Gardening has arrived in our parks. In Boston the hand of a true artist has made them beautiful, and they will be tenfold more so in twenty or thirty years, if the true aim of the designer is ever kept as a sacred trust, and not utterly destroyed by turning portions of the parks into enjoyable but inappropriate features, such as race-tracks, parade, or even circus grounds.

But parks are a very small part of this country, and their beauty alone will do but little in making the inhabited portions of this great continent attractive or pleasant.

The private homes, with large or small grounds, alone have the power to make this country beautiful as a whole, and it is to their owners that we must look for that development of taste, which can produce general good effects. Nor is this simply an æsthetic question; it is one of great importance to the nation, for beauty and attractiveness in the home are the source of much genuine happiness. They continually appeal to a man's better nature and keep him at home, when he otherwise would be away from it. As they sweeten his domestic life, they strengthen his character. Anything that has a tendency to add these blessings to our homes is a good thing for the people to acquire.

I remember once walking along a modest street in Liverpool. It was towards the close of a beautiful June day, and the workmen were returning from their daily toils. The street was composed of small houses, set a little way back from the road, so that each house had a small area of ground about it, which we generally speak of as a garden. There was one lot which particularly attracted me. The principal reason for this was that I could not look into it, owing to an irregular screen of flowering shrubs planted on the inside of the fence. The path leading to the house was curved, while the shrubbery was so arranged at the entrance that I could not even see the house. My curiosity got

the better of me and I became a trespasser. I saw a perfect picture of domestic and happy life on modest means, a problem which many fail to solve. The house was placed on one side of the lot, thus giving all the available space that was possible for a lawn, and doing away with those small and detached pieces of ground which are so hard to treat harmoniously. A gracefully curving path led to the front door, and between the boundary and the path was a plantation of flowering shrubs. The treatment of the rest of the ground was simply that of lawn framed with masses of shrubs, with perennials blooming in the margin of the shrub beds, while a few ornamental trees were so planted as to give shade to the path, and to the most desirable portions of the lawn. The house was of brick and sufficiently clothed with vines to relieve it from that bareness so often noticed with our houses. Projecting from the south side appeared a tiny conservatory with open windows filled with flowers, from the midst of which a canary was bidding his nightly adieu to all the world, as the sun began to sink with golden splendor towards the horizon. On the lawn, a man in his shirt sleeves, evidently having just finished a turn with the lawn mower, was sitting down to supper with his wife, two children, and a dog about him. A feeling of contentment was around the place, and was as pleasing to the mind as was the fragrant bloom of the flowers to the nose and eyes.

There is little danger of the gardens of the wealthy being neglected, although their designs are not always in good taste. It is, however, of great importance to the advancement of gardening that art should be displayed in those that are most numerous and most often seen. These are the small places, and what a lack of art we show in most of these in this country!

The oft repeated remark that "my place is too small to landscape" has some truth in it, as Landscape proper must have space in which to lose its lines in the hazy distance. But no place with a few feet of ground is so small but that it can be made useful, attractive, and pleasure giving.

How often we see a house standing in the centre of a lot, with neither tree, vine, nor shrub anywhere about it, nor any perceptible boundary to indicate that both house and grounds do not belong to the public highway. The only "ornamentation" to be seen is perhaps an old iron pot, burned through at the bottom, supported on three sticks, painted some brilliant color, and filled

with red-hot geraniums, growing over a small pile of stones flaming with nasturtiums. Or, perhaps we see the ugly pile of stones, known as a rockery, covered but a few weeks in the year, with often most inappropriate vines. Good taste is not difficult to acquire, for its foundation is truth and simplicity. But it does require a little common sense, and it is only a small amount of common sense that is needed to tell us that iron pots are not made for ornaments in our gardens.

Places are laid out with a view to their use and enjoyment, and with this in mind let us briefly consider what are some of the principal features that would be desirable in successfully treating the small place. It is obvious that the same cut and dried rules or plans cannot be adapted to any two places alike, for each has its own individual character and problems, which must be solved according to existing circumstances. Let us imagine, however, a small, inexpensive house placed on an average sized suburban lot.

The important living rooms are placed in the southern part of the house on account of the warmth in the winter, the pleasant southern breezes, and the beauty of the western sky at sundown. The entrance is on the north side, and the house is so placed that as much available unbroken space as possible is preserved for the pleasure grounds towards the southern portion of the premises.

As the ground slopes considerably towards the south, the material from excavating the cellar is formed into a small terrace, which offers a suitable plateau on which the house may rest. The terrace wall is of simple field stones, laid dry, with considerable batter. As this imaginary household is very fond of flowers, a small plant room is built out from the dining room, opening on the terrace. During the winter months this is entirely enclosed, but in summer the side sashes are removed, the roof being supported by light pillars on which awnings run. Vines on lattices embower the whole. Here the family often take tea, while enjoying the glimpses of their own grounds as well as the more distant views, which when pleasing have been carefully preserved. The flight of steps on the east side of the terrace leads to a small flower garden, enclosed with a low spruce-pole fence, covered with vines, and on the lawn side to the south planted on the outside with occasional masses of shrubbery to break the monotony of the fence line.

The design of the garden is a quadrangle with a narrow straight path running around it, eight feet from the fence, in which

space is a border six feet wide filled with all the old-fashioned flowers so dear to the feminine heart. In the central space of the quadrangle are a few beds, cut out of the turf, of bright colored plants, which are always kept filled from the border, the higher plants being placed in the central bed. To relieve the flat effect of the garden six pyramidal Arbor Vitæs are introduced, one at each corner of the turf space, and one in the centre of each long side. The dark green foliage forms a fine contrast to the brilliant hues around, and in winter saves the garden from desolation.

The lawn, whose broadest expanse is advantageously seen from the living rooms, runs close up to the terrace, at the base of which are two or three masses of shrubs varying in height. Vines are creeping here and there over the stones, partially hiding them from view. The effect of this planting happily unites the house to the grounds; each helps the other in forming an harmonious picture. The surface of the lawn is carefully modeled into gentle undulations, except where a sufficiently flat space is preserved for lawn tennis or croquet. Where the view of the neighbor's barn obtrusively thrusts itself upon the gaze, the ground near the boundary rises in a decided swell, which is thickly planted with shrubs, at the rear of which several poplars raise their pointed heads, shutting out from view the objectionable feature. The turf of the lawn is for the most part encompassed with bushy foliage planted so as to form little bays, according to the topography of the ground. In one of these little dells is placed a covered seat for quiet reading or intimate conversation, partially concealed from the house by a small isolated mass of shrubs placed between the house and the bay. This mass adds greatly to the effect of distance. The shrubs are planted thickly together, as the general effect is better and more immediate. Due thinning, however, is to be practised from time to time, as a too thick growth may demand. In general, the tallest growing plants are placed next to the boundary, lower ones next, while very low shrubs, creepers, and masses of ground-covering perennials are placed in front of all. The sky line of the planting varies, in some places being high while in others it is low. Thick masses are predominant here, while there they are thin and graceful, forming a picture harmonious in itself, but of endless variety. No isolated flower beds are seen in the lawn to mar this picture, for although pretty in themselves, they are detached

objects, which should be looked at separately; conseqnently they do not pleasantly intermingle with the graceful forms and effective tints which are characteristic of the lawn. As the place is too small for many large trees, a few ornamental kinds are planted here and there in pleasing conjunction with the shrubs. The laundry yard is placed as much out of the general view as possible, on the north end of the house. It is surrounded by a lattice fence covered with Virginia creeper and honeysuckles.

Such, in general, are a few of the principles which can be applied to our small places, and when they become universal, the art of gardening will have accomplished much for the happiness of man, for as Pope says: "I pity the man who has completed everything in his garden." The art of gardening when properly understood is ever bringing forth new pleasures and perpetual enjoyment.

Discussion.

Rev. Calvin Terry expressed a strong interest in the subject of the lecture. The general subject has many important features, and in speaking of it a selection must be made. He had often wondered why so many persons who have a small piece of ground, as is common in every country homestead, do not have a garden. The possibilities of such a possession are almost unlimited,—vegetables in variety, freshly gathered every day, all through the season, instead of stale ones from the markets at exorbitant prices; choice, luscious fruits through the entire year, beginning with strawberries and cherries, and then other berries in their season; apples, the prince of all fruits, throughout the year; with plums, peaches, pears, and grapes, all in their seasons, and of the varieties preferred; always fresh from the plants or trees, and at a large saving of expense and avoidance of doctors' bills. Again, one's higher nature is aroused, gratified, and developed, for man is not a mere animal. Cultivation of the garden excites an interest in Nature and her works. The spirit of intelligence manifested in every growing thing commands attention and starts into activity one's curiosity; and every effort to gratify this impulse adds to the power to see and to understand better the natural laws of life and growth. The person who thus learns to observe may notice that the roots of a tree will sometimes grow farther on one side than on any other, and stretch out yards or

even rods to where the best food for that plant may be found, indicating that there is intelligence,—a soul, as it were, in the tree. There are twenty-four hours from sun to sun, of which only nine hours are now by law required for a day's work. With no garden to engage one's hands or thoughts at home, the hours for recreation may be passed in dissipation or vice. But if a garden is awaiting attention and service, one may there be entertained by the music of the birds and other voices of Nature. There one may be carried out of narrow self-consciousness and be taught the spirit of morality and of religion, by observing the wonderful operations of Nature as there displayed. Children may there learn of these things, or be taught about them; as the father of George Washington taught him, that effects are always the results of causes, by writing the lad's name in a garden bed, and sowing therein cabbage seeds, which germinating, soon appeared to the boy's great amazement, until his father explained why and how that name was made to appear and thus directed his mind to thoughts of God by whom all things exist. Thus the garden is a profitable possession for the pecuniary, healthful, educational, moral, and religious returns which come from it to the cultivator. And could the *rich* learn to appreciate this mode of recreation and amusement, there would be less need of attempts to kill time by games, yachting, horse racing, and the like, and there would be less danger of life being suddenly and prematurely ended through ennui or excess.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 9, 1895.

A Meeting for Lecture and Discussion was holden today at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair. The following paper was read by the author:

BUDDING AND GRAFTING.

By JACKSON DAWSON, Arnold Arboretum, Jamaica Plain.

In preparing this paper on grafting I have gone somewhat away from my subject so as to give you an insight into the records of ancient methods of the growing and grafting of trees in early

times. Many of them you may call absurdities; but as you will see by the following pages, notwithstanding the faultiness of the books on the art of gardening at that time, there are many truths in them which it would be well to observe. What today we call our own inventions we find were practised by the ancients centuries ago, and while their age was one of superstition, in many cases ours is little less so today; as we shall see if we consider that their fallacies have been practised in our own country less than a century ago. Even today, not only the common people, but those who are professed horticulturists, are easily taken in by the glaring descriptions of horticultural products sent out by some of our advertisers. I have seen — right here under the shadow of Horticultural Hall — water chestnuts, bearing leaves of parsley pinned in them, sold to some of our members as something new and curious. It may not have been the ignorance of these members, because they ought to have known bêtter; but it was that same curiosity that so often gets control of the human mind; they want something extraordinary, even if they know it cannot be. They want a change, and if the ancients could have made an illustrated catalogue, showing more impossibilities in the way of fruit and flowers than we find in some catalogues of today, we might call them smart. While there are many conscientious nurserymen and seedsmen who give honest descriptions of the seeds, plants, or flowers they offer for sale, there are many catalogues that are misleading and detrimental to the business. Possibly it is true, as an eminent florist once said, that "there is a new crop of fools every year."

The Origin of Grafting.— Grafting is of great antiquity. It is mentioned by several of the Greek authors —Theophrastus, Pliny, and others— but in a rather unsatisfactory manner. It is referred to by St. Paul in his Epistle to the Romans, chapter XI, verses 17, 19, 23, 24, as follows:

"And if some of the branches be broken off, and thou, being a wild olive tree, wert grafted in among them, and with them partakest of the root and fatness of the olive tree. . . .

"Thou wilt say then, The branches were broken off, that I might be grafted in. . . .

"And they also, if they abide not still in unbelief, shall be grafted in; for God is able to graft them in again.

"For if thou wert cut out of the olive tree, which is wild by nature, and wert grafted contrary to nature into a good olive tree; how much more shall these, which be the natural *branches*, be grafted into their own olive tree?"

It is more than probable that the first idea of grafting originated or was suggested by natural inosculation of branches growing close together in a thicket, whereby the action of the wind, at certain times of the year, had rubbed off the bark of each tree, as you see quite often at the present day, and in a season of calm the two cambiums had been pressed together, had united, and firmly grown together, thereby becoming as one tree. Afterward the original top on one side or the other may have become separated from its own stem and root, and the tree or shrub may have borne two kinds of fruit at the same time. I do not mean by this that if the trees had been of two different species they would have become united, but they might have been closely allied species; for instance, a pear may have become inarched, in this natural way, on another pear; a mountain ash on a thorn; a plum on a peach or almond; or two distinct species of plum or its varieties on nearly related genera. We often see today nurserymen budding or grafting on the peach, plum, or almond, the different species of Prunus, such as *P. tomentosa*, *P. Amygdalus*, *P. Japonica*, *P. triloba*, and others too numerous to mention. However this may be, the art of grafting was practised by gardeners at a very early period. Macrobius, a Roman author of the fifth century, says that the art was taught by Saturn to the inhabitants of Latium. It does not appear to have been known to the Persians or to the Greeks in the time of Homer; and, according to Chardin, was not known to the Persians in his day (1643–1715). Grafting, it is said, was not known to the Chinese till very lately, when it was taught to a few of their gardeners by the missionaries, and to the natives of Peru and other parts of South America by the Spaniards. Some, however, infer from a passage in Manlius, and one in Democritus, that grafting may have been mentioned in some of Hesiod's writings which are lost. Pliny speaks of the mulberry growing on the briar, but whether blackberry or raspberry does not appear. The Romans propagated trees by the same methods now in common use in nurseries; fruit trees were generally grafted or inoculated. Vines, figs, and olives were raised from cuttings, layers, and suckers; willows

were cultivated for binding the vines to the trees that supported them and for making baskets, and they were grown on moist ground as they are today. It was a doctrine held by Pliny, that any scion might be grafted on any stock, and that the scion, partaking of the nature of the stock, had its fruit changed in flavor accordingly. Pliny mentions the grafting of the vine on the elm, and drawing a vine through the trunk of a chestnut, but modern experiments prove the absurdity of the idea that any union can be effected in such cases, even though some of these authors affirm they have seen what they describe. Notwithstanding the ignorance and inaccuracy which these statements betray, the Romans were aware of all our common methods and some of our uncommon ones. They propagated plants as we do; pruned, thinned, watered, forced, and retarded fruits and flowers, and even made incisions and ringed trees to make them more fruitful. One cultivator, C. Furius Cresinus, was so successful as a cultivator of fruits, flowers, and vegetables, that he was accused before the Senate of practising magic, and was obliged to justify himself by showing them his tools. "These," said he, "are the implements of magic which I use; but I cannot show you the care and toil, or the anxious thoughts that occupy me day and night." It is even so today; those who make gardening in any department a success must spend many hours in anxious thought, besides the physical labor.

During the Dark Ages, but for the monks, the art of gardening would have been lost to the greater part of Europe; and many provinces of Europe, which at present are covered with numerous orchards and cultivated fields, nourishing thousands of inhabitants, would have remained a desert or wilderness to this day.

The Greek Geoponica (that is, Horticulturist) was compiled from various ancient authors, both Greek and Roman, more than a thousand years ago. The compiler is commonly supposed to have been one Cassianus Bassus. It contains many useful observations on the cultivation of plants, fruits, and vegetables; but at the same time it is full of absurdities and superstitions. The following extracts about propagation, grafting, and growing of fruits and fruit trees may be interesting at this time: "Grafting can be done in autumn or spring; budding in spring and summer. Grafting is more successful in wet weather, and budding in dry. In dry weather water the grafts every evening. In budding, if

the wood in the billet containing the buds is removed it is weakened; but if suffered to remain the bud will make a more vigorous shoot. In grafting the olive, if the bark is thick, insert the scion under the bark. Walnut seedlings can be taken up, grafted on the roots, and then set out. In making cuttings of grapes have a piece of last year's wood attached to them. Some graft the vine half a foot below the ground, others just at the surface. Inarching is the best mode of propagating the vine; bore a hole through the vine you wish to alter, then pass the branch of the better sort through the hole, and in two years cut off the connection between the graft and its original stock and you will have a good vine. The two vines, of course, are supposed to be planted close together. The quality of fruit of a tree is improved if you graft it over with the same variety, provided your scions come from a tree whose fruit is of better quality. As to the affinities of fruit, the peach may be grafted on the plum, plane tree, or bitter almond; on the bitter almond the peach is rendered more hardy; on the plane tree it produces red peaches. Red peaches are also obtained by pouring cinnabar (dissolved in water) on the kernels just before planting. Graft the plum on pear, quince, or apple; apricot on plum and almond; cherry on the turpentine tree; pears on pomegranate, quince, almond, and mulberry. On the mulberry tree the pears are red. Graft the apple on the wild pear, quince, plane tree, or citron. On the plane tree it produces red apples, and on the citron it bears all the year round. Quinces may be grafted on the oxyacantha. Graft the vine on myrtle, olive, or cherry; on the myrtle, the fruit nearest the stem of the bunch will be myrtle berries; if you work the vine on the cherry, the grapes will ripen in cherry season; this last operation succeeds better if your scions come from a black variety of the grape. Graft figs on the mulberry or plane; citron on pomegranate, mulberry, or apple. On the mulberry it produces red citrons; on the apple black ones. The mulberry succeeds well on white poplar, chestnut, beech, apple, wild pear, or elm; on the white poplar it produces white mulberries. Graft chestnut on walnut; walnut on strawberry tree; myrtle on willow, and laurel on ash. Some graft the roots of olives, if they are above ground, while others propagate it from root slips. Graft pistachia on almond. If you work the vine on the olive, or the olive on the vine, they will produce grapes and olives; the fruit in this case is, as to flavor, a

compound of olive and grape, hence the name Elaistaphylos, that is, olive-grapes."

"I have seen," says Florentinus, "a tree of this description in the garden of Marius Maximus. This olive-grape can also be reproduced from cuttings. Any species of trees can be grafted into the quince or wild fig. When a young vine is too full of fruit, thin it out, for this process improves the size and quality of the remaining fruit. To produce stoneless fruit, split in the middle the part of a cutting, take out the pith, tie up the two parts carefully, and set out the slip. You can also, on the head of a tree, take out the pith without splitting the stock, and carefully insert a peg in its place. This method refers chiefly to grape, peach, and cherry. To bring a barren tree into bearing, gird up your loins, roll up your sleeves, then take hold of an axe or mattock, and being full of wrath approach the tree as if intending to cut it down. Let some one come up to you and beg you not to cut it down, pledging himself at the same time that it will do better next year. Then you, appearing to grant this man's request, will spare the tree, which after this will become a great bearer."

The Object of Grafting in the first place is to perpetuate and multiply and in the shortest possible time, all our choice fruit and ornamental trees and shrubs of value, that do not quickly reproduce themselves from seed or are difficult to grow from cuttings. Nearly all our named varieties of trees and many of the shrubs are propagated by grafting, so that they may the sooner become plentiful as well as a source of income. Should we resort to the propagation of our pears, peaches, plums, apples, and other fruits by cuttings and layers, it would take us many years to reap the benefit of our labors; and many would go hungry while they were waiting for the orchards of Bartletts, Seckels, Angoulemes, and other pears, as well as the Baldwins and many other apples; or the plums, cherries, peaches, and various other fruits. Yet this idea was vigorously advocated a few years ago, both in England and America by those who wanted "nothing but own root trees." Even if it were practicable, which I have reason to doubt, it would not be profitable and I do not know of any one who has planted orchards of our standard fruit trees from cuttings, and gathered fruit from them. Old, or otherwise worthless trees can be regrafted with new or more desirable kinds, and in a few years

made to produce heavy crops of marketable fruit, thus rejuvenating whole orchards in a few years, which, if they had to be replanted with new trees would require at least ten years before they came into bearing. Old vines in graperies can be grafted, and in a short time will give heavy crops of the new varieties. Seedling hybrids of fruits, many of which would take at least ten or fifteen years to become fruit-bearing on their own roots, can be top-grafted on old trees and brought into bearing in a very few years, so that the hybridizer can see the result of his labors, and by the time the original seedling would naturally come into bearing he can have enough to supply orchards for the whole country. By careful selection of stocks trees can be dwarfed, as for instance by grafting the pear on the quince; the apple on the Paradise stock; or the cherry on the Mahaleb. Fruit buds may be grafted into espaliers to supply blank spaces; or other buds to fill up where branches have been lost; or to strengthen the fruit. Plants can be made fertile by grafting in the missing sex in all dicœcious trees. Rare species, where only one of a kind has been brought from a great distance, can be propagated and made plentiful by grafting it on some near or allied species, or on its own roots. In small places many varieties of nearly equal vigor can be grown on a single plant. Species or varieties which are naturally delicate become more robust when worked on strong growing stocks. Vines produce larger and finer grapes when worked on more robust sorts, such as the Syrian, or the Black Barbarossa. It has been said that the double yellow roses, such as *sulphurea plena* and others which seldom open their blooms to perfection, grow and flower freely when worked upon the common China rose.

Mr. Knight says that the flower-buds of garden roses worked on wild roses, where they were abundantly supplied with nutriment, gave finer roses than they would have done had they retained their natural position. He reports many similar experiments upon pear and peach trees with similar success; but in the case of the pear, the buds, grafted earlier than the end of August or the beginning of September, became branches instead of flowers.

I have, myself, grafted hundreds of roses from November to March, and had them bloom as well or better than good-sized roses lifted from the ground at the same time. I found that those grafted early, say during December and January, flowered better

than those grafted in February and March; these later ones growing more to wood. The working of trailing varieties of shrubs or trees on tall stocks makes the so-called weeping trees; for instance, the Camperdown elm, weeping mulberry, cherry, salix, *Prunus Chamæcerasus*, and many others, which, on their own roots are trailers or creepers. All sorts of variegated and cut-leaved foliage trees are preserved and multiplied by grafting. It is also employed to aid the healing up of wounds, by grafting on them scions or strips of bark.

Physiology of Grafting.—Grafting and budding are governed by the same physiological principles. There must exist an affinity between the stock and the scion or else there can be no permanent union.

The physiology of grafting is, that the shoots springing from the buds of the scion become united to the stock by the newly generated tissue, which tissue, when once united, determines the ascent of the sap, rising from the stock; which sap, after being elaborated into the true or proper juices by the leaves on the scion, descends by the inner bark. The sap, however, must be sufficiently homogeneous (*i. e.*, must be prepared in plants of the same family) to be readily absorbed by the growing cellules, near which it passes. In other words, each cellule elaborates sap according to its own nature, and if the ascending sap has only an incomplete analogy with the wants of the scion, the latter does not thrive, though the organic union between it and the stock may take place; and if the analogy between the alburnum of the stock and scion is wanting, the organic union does not long continue. Hence, evergreen scions seldom succeed for any length of time when grafted on deciduous stocks, or the apple on the pear, or *vice versa*. Thus, in a physiological view, the epochs of vegetation are the principal points to be attended to, as no plant can be grafted on another which does not thrive in the same temperature. Nor can two plants in which the sap is not in motion at the same time be successfully united. This is because it is only when cellular tissue is in a state of activity — when it can form accretions — that a vital union can be formed and maintained and a reciprocal activity must exist in stock and scion for that purpose. No union can take place between the parts of two plants previously formed, except when both parts are in the act of forming the vital tissue, union being effected only by the coalition of the newly generated

tissue, thrown out by such parts as have the power of generating it. This power does not exist in the heart wood nor in the outer bark, but only in the alburnum or rather the substance imbedded between the alburnum and the inner bark, constituting the cambium.

Mr. Knight says the effects produced upon the growth and product of a tree by grafting are similar to those which occur when the sap is impeded by a ligature or by the destruction of a circle of bark; it acts by obstructing the descending sap, and so causes fruitfulness. The modification effected by the graft therefore is a subject of practical interest and importance to the grower or cultivator, for although the graft alters neither the species nor the variety of the stock it has considerable influence on its habits as well as on the production of fruits and flowers.

Affinity of Species. Graft and Stock.— Plants of the same family have an analogous origin and can be grafted only on one another with a prospect of success. The success of the operation, even within the family limits, will not always be complete; perhaps from some difference in their organic structure. In such cases practical experience must necessarily become our guide. The pear and the apple can be united only for a short period. Soft-wooded plants do not succeed well with hard-wooded ones, nor ligneous plants with herbaceous ones. The peach and the apricot are grafted on each other with difficulty, while both do well on the plum. Most cherries do well on the Mahaleb, but the Mahaleb does not succeed well as a graft on other cherries. The sweet chestnut will graft on the oak, but will not on the horse-chestnut. The medlar, which has solitary flowers, does well on the thorn, whose flowers are in corymbs. The Chionanthus, so nearly allied to the lilac with its panicled flowers and simple leaves, will do well only on the European or flowering ash, which has compound leaves. The Photinia, allied to the beam tree (*Pyrus Aria*), and the Eriobotrya, allied to the medlar, both evergreens, will graft on the medlar, and not on the hawthorn. The cotoneasters, amelanchiers, and *Pyrus Aria* all do well on the hawthorn, and by experience last longer, but make slower growth than they do on the mountain ash. *Pyrus arbutifolia* grafts well as standards on the mountain ash. *Berberis aquifolia* will grow on the common barberry, and *Prunus Lauro-Cerasus* does well on the Bird cherry.

In almost every case the grafting of deciduous plants on evergreens has proved a failure. It is always best to unite by grafting only such plants as have some analogy between them, such as vigor, time of commencing to grow, and hardiness. If any difference exists it should be that the graft be later than the stock in vegetating, and also more vigorous and hardy. Weak stocks and weak scions produce worthless trees. When a weak scion is grafted on too vigorous a tree it is difficult for the scion to absorb all the sap furnished by the stock, and an evenness of growth cannot be established between the stock and the graft; then follow weakness and disease. It is preferable to have the scion stronger than the stock; for instance, the pear on the quince and the cherry on the Mahaleb; otherwise the tree will be less vigorous than if perfect harmony exists between the two parts, and growth being thus tempered tends more to the production of fruit. The French often double-graft a tree to make its growth more uniform; for instance, a strong-growing stock is grafted with one of an intermediate growth, and on the latter the variety they wish to propagate; the stock should always be strong enough to receive the scion, for if it is weakly, although the graft and stock may unite, it will almost always make a sickly tree.

Practical Directions.— The term grafting is usually confined to the operation with detached scions; and in every kind of grafting it is essential that the two parts (the scion and the stock) be in close communication with each other, not by the wood or bark, but by the inner bark or alburnum in the tissue of which the cambium flows. The more points of contact here the greater the chance of success, which also will be assisted by a similarity of texture between the scion and the stock.

The best season for grafting out of doors is in the spring, when the sap is in motion (say from March to June); and for grafting under glass, from the first of August to the last of September, with half-ripened wood; in December and to the last of March, with dormant wood. During the midsummer days grafting either in doors or out is not often a success, although with great care it might be accomplished the year round. In all kinds of grafting it is better to have the stock started a little ahead of the scion, and it is not safe to graft out of doors with scions that are started unless you can cover up or shade them; for the evaporation that takes place at this time weakens the scion too much

before it has time to unite with the stock. A calm atmosphere and warm temperature, rather than wet and cold weather, are more conducive to success, and certainly more agreeable to the operator than when it is cold and stormy. The stone fruits, such as cherries and plums, should be the first ones operated on; afterwards the pears and apples.

The tools necessary for use in grafting are a saw, a pruning knife, grafting iron or wedge, a budding knife, a pair of good pruning shears, a whetstone to keep your knives in good condition, a bunch of raffia, bast, or waxed cloth for tying the grafts and keeping them in their places when set; also some kind of grafting wax to cover the wounds to protect them from the air and water. A number of grafting machines have been invented, especially in France, where, since the ravages of the Phylloxera, these machines have been in great demand, as they were thought to be of great advantage in grafting the grape; but an expert workman will do the work quite as well with the tools named above. There are many varieties of grafting wax and mastic, as well as other compositions for the same purpose. In the old times a composition of clay, cow manure, and chopped straw was used, and is used by some even today; and as it retains moisture better than the modern grafting wax it is recommended for coarse work and for covering large wounds in large operations.

For grafting in the open air the following compound is much used in this country: common rosin, four parts; beeswax, two parts; mutton tallow, two parts; all melted together. When cool it is applied by the hand, or, being melted, applied with a brush.

In many large nurseries, where apples and pears are grafted in winter, this wax is heated and applied thinly with a brush to sheets of cloth, and after becoming cool the cloth is torn into narrow strips and used in tying up the grafted roots and plants. I have found that where only a limited supply is wanted, it is cheapest to buy it already prepared, and for years I have used that which is sold by nearly all seedsmen as Trowbridge's grafting wax; it is as good as, or better than, any of the French mastics.

All scions should be cut before the sap begins to flow rapidly (say from January to the middle of March) for all trees that are hardy, and whose wood is not injured by freezing. But many plants with slender stems are injured by freezing and if scions

from them are wanted to propagate by grafting, they should be taken off in early autumn and heeled-in in loam, sand, or moss, in a moist pit or cellar for future use. I have found this especially applicable to hybrid roses, where the wood is wanted for winter use. A great loss of grafts is sure to be the result if you do not have the wood thoroughly ripened and taken off early in autumn and buried in the earth. Ten degrees of frost will injure many varieties of rose grafts. In selecting scions bear in mind that the wood should not be too coarse but of medium texture, healthy, and well ripened; nor should you use fruit buds, unless you want them for a special purpose; although at times we often have to use any wood we can get for scions, especially in the case of varieties which from any cause are scarce; but as a rule it is a bad policy, and as soon as possible, new or stronger shoots, from the one so grafted should be grafted on young vigorous stocks. This is an essential point and should not be overlooked, that weak or sickly scions grafted on sickly stocks soon produce a degenerate race. In good nurseries, where careful attention is given to these points, the stock trees are carefully pruned (or ought to be) and cultivated on purpose to produce a healthy stock of wood for grafts or other uses. The grafts should not be cut from the scion until just before they are to be used. Never allow scions to suffer from exposure to dry air, cold, or wet. In collecting scions of evergreen trees, I think it best to cut them from the parent plant just at the time of using them. If you must keep them over winter the best way is to lay them thinly in sand, and keep in a deep pit or cellar where it is cool and somewhat moist; if they are put in too thickly they will heat or rot.

The Methods of Grafting.— These are so numerous that a systematic classification of them would be difficult. It would only be a waste of time to try to enumerate them all, as that would be of no practical value except to show in how many different ways the work can be done. Almost every propagator has his favorite style. Those methods that are practised by skillful propagators are best; they are few and may be summed up as follows:

Inarching, or grafting by approach,
Bottle grafting,
Cleft grafting,
Side grafting under the bark, or inlaying,
Crown grafting,

Saddle grafting,
Splice, tongue, or whip grafting,
Root grafting,
Veneer grafting.

Inarching or Grafting by Approach.— This is without doubt the most ancient of all grafting methods. From time to time Nature gives us examples of it in roots or trees which have become united where they have been bruised or pressed together. Man was no doubt quick to perceive and take advantage of this hint and when once tried, to improve on it. This method is practised both in doors and out; and at one time was extensively used by both nurserymen and gardeners. When I was a boy it was about the only method in use for the propagation of azaleas and camellias. It is even now employed by some to propagate varieties which are difficult to graft otherwise.

The time for inarching out of doors is from early spring until July or August, while the tree is in active growth, and as the scions are still attached to the parent plant they can be inarched in either a woody or herbaceous state. Under glass it can be done at all seasons of the year. The simplest method is to remove from both the stock and scion plants a thin slice of the bark and alburnum from two to three inches long; then, bringing both cut surfaces together in such a manner that they shall fit exactly, to tie them firmly with bass or raffia, and cover the wound with grafting wax to keep out the air.

Another kind of inarching is similar to tongue grafting. An incision is made in the stock and the graft, and the two are bound together and waxed. Sometimes the top of the stock is cut off and tongued at the time of grafting, and the graft is joined at the cut extremity. Another way is to cut off the stock and cut out a V; the scion is then cut on both sides to fit into the stock, then inserted in the V and completed by tying carefully as in other cases. This method is much used in grafting high standard weepers, which are then tied carefully and waxed as has been directed. In grafting by this method, the trees or plants to be grafted must be in close proximity to each other. The scion plants must be either planted around the stock tree or in pots and so arranged on stands as to be easily brought in contact with the branches of the stock tree.

Grafting by approach is also used to fill up vacancies in graperies and fruit houses, to restore main branches, or increase the size of the fruit. When the graft has taken hold, cutting it from its parent stem is an important matter. It must not be done too hurriedly, but gradually, making a small incision at first, and increasing it from time to time, until the final separation is made. This may require several weeks. As soon as this is done the wound is cut smooth and covered with grafting wax.

Bottle Grafting.— This is only another method of grafting by approach. The lower end of the scion is buried in moist soil, or is inserted in a bottle of water, to keep it in good condition until the cut surfaces are united. In all other particulars it is identical in principle with inarching.

Cleft Grafting.— This system was practised at a very early date, and is a method much in use now, to top-graft old trees in orchards, or to renew individual trees, as well as young stocks that have become too large to bud, and in order to bring them into bearing more quickly. This was probably one of the first kinds of grafting that the Pilgrims used in the new world, and for a long time was practised the most of any kind. But, compared with other methods, it is rather crude, as there is a large amount of cut surface to be healed over by the new growth, which often takes a long time. In cleft grafting the stock is cut off with a saw, at a point at which to insert the scion. This surface is smoothed off with a sharp pruning knife. Then with a knife, a grafting iron, or thin chisel, split the stock through the centre, being careful to divide the bark at the same time so as to leave the edges smooth. The cleft is kept open by means of a wedge. The scions are then cut in the shape of a wedge, and fitted into the cleft (one on each side if the stock is large) taking care that the two cambium-layers meet on the edge near the bark. If the stock has very thick bark slightly incline the lower end of the scions inward to the cleft to make sure that some part of their cambiums may come in contact with the cambium of the stock. In large stocks it is not necessary to bind the graft before waxing; but in smaller ones it brings the parts into closer union and holds them there. When the stocks are small it is not necessary to put in two scions, or to split the stock entirely across, but only part way, holding the cleft open with a knife while inserting the scion. This is a much better way when it can be done, as there is less cut surface to be covered.

When the stock is very large, more than two scions can be used by making two parallel clefts, so placed as to leave the pith in the centre untouched. March and April comprise the usual time for grafting out of doors. Cleft grafting can also be performed in the latter part of the summer by using well-ripened wood. The grafts would make no growth but would merely become united. Terminal cleft grafting is only a modification of cleft grafting, and is done by splitting the bark through the terminal bud without heading down the stock. The scion is cut with a regular double slope and inserted the same as in any cleft grafting. The stock and scion are then firmly bound together. As soon as the stock and scion begin to grow, the shoots are pinched but not cut off, as they draw the sap towards the graft, which is essential in plants that are slow to unite. This kind of grafting is used on both the walnut and the fir tree.

Side Grafting.—This term is applied to a number of processes of grafting in which the head of the stock is not cut away. The most simple side graft is that in which the scion is cut with a long splice, perfectly smooth and thin to the bark. Then from the stock a thin strip of bark and wood two or more inches in length is cut. Fit the barks exactly together and bind firmly. This is a favorite method of grafting the camellia and azalea, and should be done under glass. In side grafting with a vertical cleft, the scion is cut half its length on both sides in the form of a thin wedge. The stock is cut with one stroke of the knife, allowing the blade to penetrate the alburnum. The scion is then thrust in the cleft thus made and held in its place by a ligature of bass or raffia. This kind of grafting can be used for camellias, or in fact any plants under glass. It is especially used in herbaceous grafting, such as chrysanthemums, potatoes, tomatoes, coleus, cacti, and other succulent plants. In succulent plants it is not necessary to pare them down as thin as in woody ones, but to leave them more in the form of a wedge. Side grafting can also be done under the bark in spring when the stock is in an active state of vegetation, so that the bark will lift easily from the wood, as in the case of budding. The scion is cut with a long splice, thin towards the point. An incision is made in the bark as in T budding, cutting through the bark but not into the wood. The bark is then raised and the scion slipped under it. It is then tied and covered with grafting wax, to exclude the air. There are other systems of side grafting, but they are only modifications of one another.

Crown Grafting is similar to cleft grafting. It is practised in spring, as soon as the bark is easily separated from the wood, the stock being headed down several weeks before the time of grafting. The scions should be cut with a flat, sloping cut on one side; but instead of splitting the stock the bark is divided from the top downwards an inch or more, and lifted as in budding. The scion is then inserted under the bark. A small implement of wood or ivory, made in the form of the scion, can be used to advantage in preparing a place to insert the scion much more easily than by lifting the bark with a budding knife, and with less fear of bursting the bark, or injuring a tender scion. In another form of crown grafting, the scion is cut half way through and the wood removed, leaving a square shoulder at the top near a well-developed bud. A corresponding strip of bark is removed to admit the scion. The two parts are then fitted together and bound with waxed cloth, and the top of the stock as well as that of the scions is then covered with wax to prevent evaporation.

Saddle Grafting.— By this method the stock is cut, with a slant on two sides into the form of a wedge, while the scion is cut just the reverse, so that when in position it stands astride of the stock. But it takes more time than other forms of grafting. The rhododendron is now largely grafted in this way.

Tongue or Whip Grafting.—This method is most commonly used in nurseries, for grafting fruit frees, where seedling stocks from one to three years old are used. The stock and scion are nearly of a size. The scion is prepared with a long sloping cut, and the stock in the same manner. A small cleft or split is also made about midway of the cut portion of both the stock and scion, forming a tongue on each. These tongues are inserted into the cleft in the other part, thus forming what is called a tongue or splice graft. They are then bound with waxed cloth, heeled in, in boxes about a foot in depth, in finely sifted sand or loam, and kept in a moist cellar until spring, when they are put in a warm place until they show signs of starting. They are then planted in nursery rows, covering the graft to the first eye.

Root Grafting.— Many plants, that are difficult to grow from cuttings, can be successfully grafted on pieces of roots, either their own or those of another plant. Many woody plants, of which we have no allied species, can be grafted on pieces of their own roots.

All methods of grafting can be used in root grafting; whip, splice, side, cleft, or veneer. Always cut the roots as they grow from the stem, keeping the neck up. Plants that grow from root grafts are numerous. The pæony, bignonia, wistaria, rose, hydrangea, clematis, chestnut, plum, pear, apple, dahlia, magnolia, and many others can be root grafted. Sometimes when we receive a new plant and can find no stock to work it on, I cut off a few of the roots and graft them with their own branches. I tried to propagate *Cæsalpinia Japonica* for two years from cuttings, but did not succeed. Last fall I dug up the plant, selected some of its best roots, and veneer grafted some of the best shoots upon them; now I have several plants. *Hydrangea vestita*, a hard plant to grow from cuttings, does well on the roots of *H. paniculata*. *Combretum purpureum*, a rare stove climber, can be grafted on its own roots. *Euptelea polyandra*, a scarce Magnoliaceous plant, and many others, can be worked successfully in the same way. When I speak of root grafting, I mean pieces of detached roots — not seedling plants, cut down and grafted on the crown. For many plants, grafting on the crown of the root will be better than on the stem, on account of the softness of the tissue beneath the ground surface. This is a favorite way with roses, so as not to have them sucker from the roots.

Veneer Grafting.— This is one of the best methods of propagating hard wooded plants under glass, and can be practised from November to April, and from August to October. In this mode of grafting the plants should be established in pots for the convenience of handling, as well as for the success of the operation. Seedling plants are the best, but many varieties can be grown from cuttings or layers. Pot the plants in early spring, and plunge them in frames or in a sheltered position, giving them attention, as to watering and pruning, during the summer or until wanted for use. In grafting, select a smooth place on the stock, and with a sharp knife make a slight cross cut downwards in the stock, cutting through the bark and slightly into the wood. Then insert the blade two or more inches above, cutting off a thin slice of the bark down to the cross-cut. A corresponding slice is taken off the scion. They are then fitted together so that the two cambiums meet, then tied firmly and placed inside of the greenhouse in close frames, and slightly sprinkled overhead when necessary. Keep the plants close for the first few days and syringe when

necessary to keep up a moist atmosphere. As soon as the plants begin to knit together, air can be given during the morning and evening, and after a week or two the air can be kept on all day. The time taken by the different varieties to unite varies from two to four weeks. After the grafts have begun to unite, they should be removed from the frames, but kept inside the greenhouse for a month or more before being planted out or removed to their winter quarters. My method has been, as soon as I am certain the grafts are all right, to turn them out of the pots and transplant them thickly in boxes. As soon as they are well established they are put out of doors in a sheltered place to harden off. When no double frames are at hand, I have found a bed of sphagnum moss, three to four inches deep, a good substitute, laying the plants on their side, and covering the base of the graft an inch or two with damp — not wet — moss. This gives out a gentle moisture, and the graft is not subject to sudden changes of temperature, as it would be otherwise. All coniferous plants are much more easily propagated by veneer grafting than by any other method. Their treatment after grafting is similar to that of other plants, except that they should not be headed in until the second year.

Budding.— This consists in taking a bud with a portion of bark attached to it, from one tree, and inserting it in some portion of another, or in the same tree. In order to do this, a longitudinal incision is made through the bark of the stock, to the wood; a cross cut is then made at the upper end forming a letter T, into which a bud, previously prepared, is inserted, either with or without removing the inner wood from the bud. In budding, it is necessary that the bark of the stock should part readily from the wood without being torn. If the bud is inserted when the flow of sap is abundant, it immediately comes in contact with the nourishment it requires for its support. In budding, it is necessary to have a budding knife to prepare the buds, and for opening the bark to admit them; also tying material to hold the buds in place after they are set. In selecting the buds, the young shoots of the previous year's growth are the best — neither too gross nor too weak. The best buds are those about the centre of a stem or shoot. As soon as the scions are cut, the leaf blades should be removed, leaving a small portion of the leafstalk attached to it which facilitates the handling of the bud. Buds should never be

allowed to get dry, nor should they stand in water too long. Unless they were shriveled when received, damp moss or cloth is the best material to keep them in.

Shield Budding.—This is the method most practised in nurseries. It is done from July to September, according to the kinds and varieties of plants to be budded. There are many forms of budding; such as budding with a cross-shaped incision for chestnuts or other plants with large buds; and inverted budding, when the sap is in excess, as in the maple.

Veneer Shield Budding.—This method is sometimes employed when the sap does not flow freely enough to allow putting the bud under the bark. It consists of an oblong, four-sided strip of bark, marked with four cuts, leaving the eye or bud in the centre. This strip of bark is lifted with the budding knife, and removed with the bud from the scion. A corresponding strip is taken from the stock, and the prepared bud is fitted into its place, and treated the same as any bud.

In many places, especially in Holland, double budding is practised on roses; that is, two buds are inserted opposite each other in the same stock. There are various other methods of budding used, but the common shield budding I have described answers all purposes, and is almost universally practised. In preparing the bud, take the shoot in your left hand; then at about a half-inch above the bud, cut through the bark and a little into the wood back of the bud, and the same a half inch below it; next make a horizontal incision in the stock first, and from this make another incision downwards, about an inch long; lift up the edge of the bark by passing the blade up to the horizontal position, at the same time holding the bud by the leafstalk; slip it into the incision as quickly as possible, so that the bud shall not become dried. If the upper part of the bud does not fit, it must be cut across so as to allow the bud to sit firmly on the stock. When the bud is fitted, bind it with bass both above and below, leaving only the bud and the leafstalk exposed. At the end of a week or ten days the ligatures should be looked over to see that they are not strangling the stock. If they are cutting into the stock they need to be loosened only, as it is not always safe to take them away entirely. Budded stocks are usually headed down to about six inches above the bud the following spring. As soon as the buds begin to grow,

it is necessary to tie them up to the stalk that is left. Disbud all suckers from the stock, before they get too strong, by rubbing the hand quickly up and down the stalk while these shoots are young. When the buds that were inserted are a year old, the old stems should be cut off smoothly to heal over.

In the propagation of plants by grafting, it is fully as necessary to know the kinds of stocks to work on, as it is to know how to perform the operation, and while I have not the time at present to speak of all the stocks used, I will give a list of the principal ones.

The five-leaved pines, such as *Cembra*, *parvifolia*, and others, all do well on *Pinus Strobus;* and on *P. sylvestris* (the Scotch pine) and *P. resinosa*, all the rest of the pines will succeed. *Picea excelsa* will do for all the spruces, while *Abies pectinata* and *A. balsamea* will serve well for the Silver firs. The common arbor vitæ *(Thuja occidentalis)*, and *Chamœcyparis pisifera* make good stocks for the *Retinosporas.* Almost all junipers do well on the red cedar, *(Juniperus Virginiana).* The common hemlock *(Abies Canadensis)* is good for all the varieties except *A. Douglasii* and *A. Mertensiana.* On the common European larch, *(Larix Europœa)*, you can graft all the varieties, excepting *Pseudolarix Kœmpferi.* For Rhododendrons, the general stock used is *R. Ponticum*, but *R. maximum* might also be used. All deciduous Rhododendrons (Azaleas) can be grafted on *R. viscosum* or *R. nudiflorum.* All types of *Kalmia latifolia* can be worked on the species. Most varieties of Amelanchier, some forms of mountain ash, and *Pyrus Aria* and varieties, make good plants when grafted on the hawthorn. All apples will thrive on seedling stocks, but while *Pyrus Toringo* and *P. baccata* varieties will grow on the common apple, they do better on seedlings of *Pyrus baccata. Prunus mirobalana* makes a good stock for nearly all plums; and all of the flowering section do well on it, such as *Prunus tomentosa*, *P. triloba*, etc., and I think the Peach is longer lived when worked on the plum. *Pyrus communis* is a good stock for all species and varieties of pear, except for dwarfs; although if it were plentiful enough, *Pyrus betulæfolia* would make one of the best of stocks for pears on high light ground. The Manetti, brier, and multiflora are best for most roses. All lilacs will succeed well if grafted on the privet and lilac; but I think, if it were plentiful enough, *Syringa villosa* would make a much better stock for them. Clematises graft easily on the roots of *Clematis Flammula*, and

C. paniculata. *Cornus florida* makes a good stock for all its varieties. *Parrotia Persica*, *Hamamelis Japonica*, and others will graft on the common witch hazel. All lindens can be grafted on the American or European varieties. *Vitis Labrusca* and *V. æstivalis* make good stocks for all hardy grapes. *Euonymus Europæus* is a good stock for all the Euonymus family. *Acer platanoides* does well as a stock for all the forms of maple excepting the Japanese maples, which will grow only on *Acer palmatum* or *A. Japonicum*. *Robinia Pseudacacia* is good stock for all the species and varieties of Robinias. All Wistarias grow well on the roots of *W. Chinensis*. *Caragana arborescens* suits all the Caragana species and varieties, and also *Halimodendron argenteum*, and possibly other Leguminosæ. *Viburnum opulus* and *V. dentatum* make good stocks for all Viburnums; *Catalpa speciosa* for the other Catalpas, and for *Tecoma radicans*. *Ulmus campestris* is best for all the English elms, and *U. Americana* for the American types. *Quercus rubra* is best for most of the oaks, although I believe the red oaks would do better on *Q. rubra* var. *tinctoria*. All the hornbeams and hop hornbeams, work more readily on *Carpinus Betulus* than they do on our own species. The European white birch *(Betula alba)* is the best for the general run of birches, while *Alnus incana* does well for the alders. *Corylus Avellana*, the English hazel, is a good stock for all the species and varieties. The common horse-chestnut *(Æsculus Hippocastanum)* is good for all its varieties, as well as the red and the yellow buckeye, *Æ. rubra* and *Æ. flava*. The fine varieties of hickory will graft on *Carya porcina*, and *C. alba*, but I believe they will graft more easily on *C. amara* (the bitter-nut); it is of much more rapid growth than the other hickories, and while young the tissues are softer. The common chestnut is a good stock for all the Japanese, English, and Spanish chestnuts. *Cerasus sylvestris*, (the Mazzard cherry), is as good a stock as can be found for standard cherry trees, and *C. Mahaleb* will serve well for dwarfs. *Prunus demissa* will graft on *P. Virginiana* but not on *P. serotina*. The American and European beeches make equally good stocks for all varieties of that genus. *Gleditschia triacanthos* is a good stock for the weeping, and also for all Japanese varieties. *Pterostyrax hispidum* makes a hardier plant if grafted on the Halesia, than it does on its own roots. *Magnolia tripetala*, or umbrella tree, and *M. acuminata* (the

cucumber tree) make good stocks for all deciduous magnolias. The umbrella varieties have more roots and are more easily transplanted.

Discussion.

Mr. Dawson exhibited many drawings illustrative of the several methods of grafting and budding which he described. He also brought a large number of living plants, which had been budded or grafted, and which represented not only all the methods of which he had spoken, but the practical application of each to a great variety of plants, including evergreen and deciduous, hardy and tender, trees, shrubs, and vines. At the conclusion of his lecture, many from the audience gathered about him, to examine his exhibits; to question him as to details; to witness the practical illustrations which he gave, and to hear his explanations of details as he performed the operations.

Shield budding, he said, should be the method used on most nut-bearing trees, as it proves the most successful one for them.

Where one has a rather light sandy or gravelly soil to be used as a fruit garden or orchard, he thought *Pyrus betulæfolia* would be the best stock on which to work pears, being naturally adapted to thrive in such a soil.

In grafting beeches the work should be done near to the surface of the ground, to secure the best results.

Never bud or graft grape vines, until the stock plants are in full foliage; otherwise bleeding may ruin the whole work, and even kill the stock plant.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, March 16, 1895.

A meeting for lecture and discussion was holden today at eleven o'clock, the President, Nathaniel T. Kidder, in the chair.

The following paper was read by the author:

Some Notes on Tomatoes.

By W. M. Munson, Horticulturist to the Maine State College Agricultural Experiment Station, Orono, Me.

Next to the potato, the tomato stands, perhaps, at the head of the list of garden vegetables in commercial importance. In

Maryland alone there are as many as twelve thousand acres devoted to this one crop, while in New Jersey, Delaware, Ohio, Indiana, and Illinois, the crop is of special importance.

By far the larger portion of the area devoted to this crop is employed in supplying fruit for the canning factories, and it is this demand of the canneries which, more than any other, has given the great impetus to tomato culture. The credit of introducing canned tomatoes as an article of trade is due to Mr. Harrison W. Crosby, who made his first venture in 1848, while steward of Lafayette College, Easton, Pennsylvania. There was a ready demand for the goods, and with increased supply and improved machinery, the cost has been reduced from fifty cents per can, in 1848, to seven cents at the present time.[1] With this reduced cost, the output of the factories has increased to an almost incredible extent. The total output for 1894 was nearly six million cases of two dozen cans each, as compared with less than three million in 1887.[2]

Classification and History.— Our garden varieties of tomatoes belong to two distinct species — *Lycopersicum pimpinellifolium* Dunal, and *Lycopersicum esculentum* Miller. The former is represented in the garden by the "Currant," or "German Raisin" Tomato, which is of weak spreading habit, with small thin foliage and very delicate flowers, arranged in two ranks on a long raceme. The whole aspect of the plant is delicate, and the long racemes of fruit are not unlike clusters of currants. This species is found wild in Peru and Brazil, and but little is known of its history. It has not been modified by domestication, and probably has not been long under cultivation. The chief value of this species, aside from its use as an ornamental plant, and to a limited extent for preserves, is in the breeding of new types, as I shall suggest in another connection.

Lycopersicum esculentum, the ordinary tomato, is undoubtedly a native of Peru, but is spontaneous or indigenous throughout Mexico, and as far north as Texas and California, in a form closely approaching the Cherry tomato of the gardens. So far as we know, it was first cultivated in the south of Europe. It is

[1] Am. Grocer, Jan. 11, 1893.
[2] Ibid, Jan. 9, 1895.

mentioned as early as 1561,[1] while in 1583 "the fruit was eaten upon the continent, dressed with pepper, salt, and oil.[2]" It was grown in England in 1597,[3] but for many years was used only for ornament. In 1700[4] Tournefort mentions seven varieties, one of which was pale red, one striped, two yellow, one white, and two red; but the culture was still neglected, for in 1819[5] only four red varieties are mentioned, and the pale red sort is not named.

England was much behind the Continent in the general culture of the tomato, but our own country was still later. The fruit is said to have been introduced into Philadelphia by a French refugee from St. Domingo in 1798,[6] and in 1806 M'Mahon writes: "The tomato is much cultivated for its fruit in soups and sauces, . . . and is also stewed and dressed in various ways and very much admired."[7] It was introduced into Salem, Mass., about 1802 by an Italian painter, Corné, "but he found it difficult to persuade the people even to taste the fruit."[8]

The tomato began to be cultivated for market in this country about 1829, but not until 1839 was it mentioned in the premium lists of this Society.[9]

Variation in the Type.— As before remarked, the Cherry tomato of the gardens approaches very nearly the wild type of the species, but the tomato is one of the most variable fruits we have under cultivation, and is readily susceptible to the influence of selection. Its variability lies mainly in size, form, and number of cells, and, as shown by Bailey,[10] the latter character may, to a large extent determine the former. In nature there is a definite number of cells in the fruit of any given species, but one of the first effects of cultivation is to render this character inconstant. In our cultivated varieties of tomatoes, we find almost as many different forms and combinations of cells as there are individual fruits. In the wild type there are normally two cells. The effect of cultivation has been to increase the size of the fruit by the interposition of new cells, this condition resulting in the angular shapes characterizing many of the garden forms. In

[1] Anguillara, Semp., 217.
[2] Dodonæi Stirp. Hist., 455.
[3] Gerarde, Herball, 1st ed., 275.
[4] Inst. Rei. Herb., I, 150.
[5] Trans. Lond. Hort. Soc., III, 347.
[6] Manning, Hist. Mass. Hort. Soc., 40.
[7] M'Mahon, Gard. Calendar, 319.
[8] Felt, Annals of Salem, II, 631; cited by Manning, Hist. Mass. Hort. Soc., 40.
[9] Manning, Hist. Mass. Hort. Soc., 248.
[10] Am. Naturalist, June, 1887, 573.

other words, the modern large fruited and irregular sorts have been developed first by the augmentation of cells in the primitive type, and later by the modification of the flower, and the production of an abnormal number of parts.

The direction of variation and order of development suggested by Bailey[1] seem most natural. Starting with the Cherry tomato and adopting, slightly modified, Bailey's expression of the evolution of forms we have:

CHERRY:
- *Pear-shaped and oblong sorts*,— King Humbert, Nisbett's Victoria, etc.
- *Angular sorts*,— Orangefield, Hundred Day, etc.
- *Yellow apple-shaped sorts*,— Green Gage, White Apple, etc.
- *Large red sorts*,— Little Gem, The Cook's Favorite, and thence to Paragon, etc.
  - *a*. Grandifolium,— Mikado, Potato Leaf, etc.
  - *b*. Validum,— Tree Tomato.

The history of the introduction of our common sorts is, no doubt, familiar to most of you. The old Large Red of the earlier catalogues was followed in 1862 by Fiji Island, and in 1864 by The Cook's Favorite. In 1866 Tilden appeared and then in rapid succession Maupay, Keyes's Extra Early, Boston Market, General Grant, Trophy, and Paragon.

Paragon was a marked step in advance over all former introductions. It was really the first of the round or apple shaped varieties to attain prominence, and gave a great impetus to the culture of the tomato as a field crop. It was a triumph for the application of correct principles of selection, for, in the production of this variety, the habit of a whole plant rather than the character of an individual fruit was considered.

In 1880 Perfection appeared and during the ten years following, Favorite, Beauty, Dwarf Champion, Lorillard, Ignotum, and a host of less worthy sorts have followed, until it would seem that the limit of profitable variation may have been reached.

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[1]Cf. Bailey, Bul. 31, Mich. Agr'l College, 6.

Breeding New Varieties. Is it true that the limit of improvement in the tomato has been attained? For New England I should say emphatically, No. In general the shortness of our season is such that a new and much earlier variety is needed to insure a crop before heavy frost. With this end in view we have for several years been breeding new races of tomatoes.

In 1891 crosses were made between Ignotum, one of the most valuable market varieties, and Peach, an early and productive sort which is too small and soft for general culture. Ignotum was used as the female parent. Plants resulting from these crosses were grown in the field the following year with very satisfactory results. There was a marked influence of the male parent in the character and habit of the plants, but, save in size, the fruits were not very different from Ignotum. The increase in earliness and productiveness was very marked. Whereas the average number of ripe fruits on pure Ignotum plants previous to frost was but *eighteen*, that on the crossed plants was *forty*. But, as before remarked, the size was considerably reduced.

Seeds were saved from these crossed plants and the following year a comparison was made between two generations. There was a falling off of nearly forty-four per cent in the total number of fruits borne, and of thirty-one per cent in the number ripened before frost. The past season three generations were grown side by side, with practically the same results.

A cross between Lorillard and Peach, carried along the same lines as the one just mentioned, has behaved in a very similar manner. In both cases the second and third generations showed a tendency to split up into various forms, and showed the influence of the male parent more plainly than in the first generation. In other words, although promising forms have been obtained, no type has as yet been firmly fixed.

The most interesting and important work we have done in breeding tomatoes is in connection with a true hybrid between the two species. The variety selected for the female parent was Lorillard, a well-known sort of medium size and valuable for forcing, but only moderately productive under field culture. The male parent was Currant — so far as I know the only representative of *Lycopersicum pimpinellifolium*. The hybrid is almost exactly intermediate between the two parents. The form and general texture of the foliage is suggestive of Currant, while the size

is equal to that of Lorillard. The blossoms though larger, were of the type of Currant and the fruit is borne on long racemes, very similar to those of the male parent. The individual fruits, however, were fully four times the size of Currant. The object in view in this work has been to combine the earliness and the productive qualities of Currant, with the size and vigor of the common type. To this end, crosses have been made between the hybrid already mentioned and the female parent, Lorillard, and again between this cross and the same parent. The results are in every way encouraging, but the end is not yet. The crosses still retain the distinct evidences of the influence of the original male parent, but are gradually increasing in size and now frequently show a more or less angular form, as found in the common type.

Many attempts have been made to secure a yellow tomato with a distinctly blush cheek; but as a rule no satisfactory results have been obtained. One variety has been sent out as "Lemon Blush" but in our own experience the blush has never appeared.

We have repeatedly made crosses between the red and the yellow varieties, but in every instance red fruits have resulted. At the present time, however, we have under observation a selection from Golden Queen, which is very promising. From our studies of this strain, I am convinced that the desired type may be produced more easily in a southern climate or under glass, than is possible under field culture in our latitude. The same plants produce much more highly colored fruit in February and March than in December or January, while cuttings from plants which bear well-colored fruit in the forcing-house, as a rule yield less highly colored fruit when grown in the field. It is hoped by continued care in selection to fix the type.

There is little doubt that varieties or strains, "run out," or lose their distinguishing characteristics. This variation in type may, and often does, occur very early in the life of any given variety, but with careful selection on the part of the grower, a type may be preserved for many years. It must not be understood, however, that "running out" necessarily implies deterioration, for such is not the case. A type may lose its distinguishing characteristics by reason of improvement, as well as from neglect or other causes tending to deterioration.

The Ideal Tomato.— Naturally the per cent of solid tissue in any fruit is in direct proportion to the number of cells, and in producing a new tomato, we must bear in mind a given ideal. The ideal tomato must be of medium size, firm texture, rich color, perfectly smooth, and must be early and prolific. Such a variety we have not at the present time.

My own taste would call for a fruit which is solid and "meaty" — one which contains thick cell walls, but relatively few seeds. Such a fruit was secured in the best strains of Ignotum, while that variety was in its prime. The Stone also is of this type, but neither is satisfactory in New England. The type represented by Yellow Victor, which has a hard, almost woody, core, is of course objectionable. On the other hand, some tastes demand a fruit with a large per cent of "pulp," a character found in those sorts with relatively few cells. For such tastes Chemin Market is excellent. But while it is one of the most prolific sorts we have grown under glass, this variety is so late as to be discarded for field culture.

Solidity, however, is largely an individual rather than a varietal character. As already noted, the solidity of a fruit depends on the relative number of cells or seed cavities. It should be added that a further controlling factor, is the number of seeds present. Now we know that the amount of pollen available has an important bearing on the seed production of most fruits. In other words, within certain limits, the amount of pollen received by a given flower, by determining the number of seeds produced, may to a large extent control the size, form, and relative solidity of the resulting fruit. Every grower is familiar with the small unmarketable fruits so common in the house during winter. A careful study of these fruits will reveal the fact, that most of them are nearly if not quite seedless.

Cultural Notes.— It is unnecessary at this time to go into the details of the culture of tomatoes. It may be well, however, to call attention to some of the more salient points which have received our attention during a somewhat extended study of this plant,— leaving any points of general interest to be brought out in discussion.

Our practice previous to setting plants in the field, is to sow the seed in flats about April 1, and, as soon as the plants begin to crowd, to remove them to three-inch and later to four-inch pots.

I am aware that some of the best cultivators combat the idea that frequent handling is of advantage in securing strong stocky plants, but in our own experience the practice has always been found beneficial.

Each year but strengthens our conviction that, if properly handled in the house, tomatoes may, with good results, be set in the field much earlier than is commonly supposed. The notion often expressed that the tomato is specially susceptible to a chill early in the spring, seems to be without foundation. The check frequently observed is more often due to lack of available plant food than to the "shock" of transplanting.

Trimming the plants in midsummer has usually resulted in hastening the maturity of fruit already set, and as only a relatively small portion of the crop will ripen in any case, the practice may be regarded as a good one for amateurs. It is questionable, however, whether there is sufficient advantage to warrant the practice in commercial plantations.

The old notion that tomatoes do best on relatively poor soil, was long ago exploded,[1] but comparatively little accurate work has been done toward determining the specific element or combination of elements which will produce the best results. Deductions from work conducted in Maryland[2] indicate that potash has a tendency to produce a relatively large percentage of acid in the fruit, while phosphoric acid seems to have a similar effect on the sugar content. Voorhees[3] has found that nitrate of soda, while increasing the yield, does not do so at the expense of earliness of maturity, if used in small quantities or in two or more applications; but if large quantities of nitrate were used in one application, maturity was retarded. Moreover it was concluded that nitrogen is the ruling element in the growth of the tomato, though its effect is dependent on the presence of a full supply of other elements.

In general, we may conclude that while heavy fertilizing does not lessen productiveness, the best fertilizers are those which act quickly, or hasten growth early in the season.

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[1] Cf. Bailey & Munson, Bul. 21, Cornell Expt. Sta.
[2] Patterson, Bul. 11, Md. Expt. Sta.
[3] Bul. 63, N. J. Expt. Sta.

Forcing.— The winter forcing of tomatoes is one of the most interesting and satisfactory operations of the gardener, and many have found it a profitable enterprise. The crop is one which demands care and intelligent management, but such conditions are well repaid by a ready demand for the products at high prices.

The most important conditions are: a warm, light, house — one having a two-thirds span facing the south being preferable,— strong bottom heat, rich soil, careful training, uniform temperature, care in watering and in pollinating; and above all, good judgment and constant watchfulness on the part of the grower.

Our practice may be briefly outlined: We always plan for two crops each season and as, in our northern latitudes, from four to five months are required for the tomatoes to reach maturity, we arrange that a large part of the growth of each crop shall occur without special expense for heating. The first crop is started about the first to the middle of July, and, if put on the fruiting benches in September, the crop will be in its prime in season for the holidays. The second crop is started in October, and is thus ready to take the place of the first lot, when their fruit is off in February.

When on the fruiting benches, we usually grow the plants in boxes eighteen inches square and a foot deep, four plants being placed in each box. Each plant is trained to a single stem, and thus occupies about one and one-half square feet of floor space. In training, strong flax cord, the size of wool twine or a little smaller, is used. A single strand extends from the base of each plant to the roof, and the plant is secured to the cord by bands of raffia.

Some commercial growers consider it necessary to attend to the pollination of each individual flower. Tomato flowers are highly self-fertile, however, and the only attention we have found necessary is, on bright days when the atmosphere is relatively dry, to give each plant two or three sharp taps with a padded stick.

From an extended study of the subject, I am convinced that failure to secure satisfactory results in forcing tomatoes is very commonly due to an insufficient supply of pollen. We know that when only a small amount of pollen is supplied to the stigma an undersized or irregular fruit invariably results; while, as already

suggested, the small unsalable fruits whose history has not been traced, are almost invariably seedless, or supplied with a very small number of seeds. I therefore regard some method of artificial pollination as of the greatest importance.

The varieties found most satisfactory for forcing are Lorillard, Ithaca, Chemin Market, Optimus, and Golden Queen. In our houses, for several years past the average crop from several of the leading varieties has been about 2.5 pounds per plant or 1.7 pounds per square foot of floor space. If we are sure of fifty cents per pound, the crop is a paying one.

A Brief Resumé.—The sum of the whole matter then, is this:

1. *Lycopersicum esculentum*, from which most of our common varieties of tomatoes have been developed, is a native of Peru, but is spontaneous or indigenous as far north as Texas and California, in a form closely approaching the Cherry tomato of the gardens.

2. The tomato was first cultivated in the south of Europe and is mentioned as early as 1561.

3. The fruit was used for food in 1583, but was slow in coming into general use. Seven varieties were known at the beginning of the eighteenth century, but not till a hundred years later did the culture become general in England.

4 The tomato was known and used as an article of food in this country in 1806, but was not grown for market until about 1829.

5. The modern large fruited and irregular varieties, including the French Upright, and the Grandifolium or Mikado type, have undoubtedly been developed from the Cherry tomato or a closely related form; this development has apparently come about largely by the augmentation of cells in the primitive type.

6. The results obtained from crossing the common tomato with *Lycopersicum pimpinellifolium* indicate a promising field for the development of new types.

7. Solidity of fruit is an individual, rather than a varietal, character, and this character is often dependent on the amount of pollen received by the flower.

8. If properly handled in the house, tomatoes may be set in the field much earlier than is commonly supposed, with good results.

9. Trimming plants in midsummer has usually resulted in slightly hastening the maturity of fruit already set.

10. While heavy fertilizing does not lessen productiveness, the best fertilizers are those which act quickly and hasten growth early in the season.

11. For New England the most profitable work with tomatoes may be carried on under glass. For this purpose Lorillard, Chemin, Optimus, and Golden Queen, are the most promising.

Professor Munson exhibited a variety of photographs, to show the methods of training in the forcing house, and in field culture; the effect of varying amounts of pollen on the flowers of one plant, *i. e.* where deficient; when sufficient; when excessive. Others showed the effects of different fertilizers used in both greenhouse and field; and also where different amounts per acre were used.

Discussion.

William C. Strong asked : When do you put out young tomato plants in the field, in spring? How do you avoid the killing effects of spring frosts?

Professor Munson replied that they get them out by the fifteenth of May, or as soon after as the weather will permit. The best results are always obtained from the earliest settings. If properly hardened off, tomato plants will endure a much lower temperature than is commonly supposed. One reason that young plants are so easily cut down by frost is the usual lack of vigor following transplanting. He believed that this weakness is more often due to starvation than to a sudden change of temperature. The supply of nitrogen, in a readily available form, seems insufficient for the needs of the plants. A solution of nitrate of soda — say three ounces to a gallon of water — applied at the time of setting will, by inducing vigorous growth, render the plants better able to withstand checks of any kind.

Benjamin P. Ware expressed much interest in the statement made in the lecture, regarding artificial pollination of tomato flowers, and he asked if it was necessary in field culture.

Professor Munson replied, No, the forces of Nature — wind and insects — attend to it there.

Mr. Strong asked whether tomato plants could be made to produce fruit more than one year in New England. He spoke of the tomato plant as being perennial in Southern California, he having seen plants in fruit there which were more than one year old, although not in a thrifty condition. He had lately seen, in the island of Jamaica, plantations of them producing fruit in great abundance, and in perfection throughout the winter months, especially on the southern side of the mountain range, where the soil is comparatively dry. It would seem that the fruit might be sent to our northern markets with profit, the passage by steamer being less than six days. But it is found to be very difficult to get it here in good condition. It is a fruit that does not keep or carry well.

Professor Munson said he had sometimes taken two crops of fruit from the same plant. After the first crop had been taken from a forced plant, in January, the old growth was coiled upon the top of the box of soil, in which it grew, and some fresh soil put over it. Soon after, new shoots started out, grew well, blossomed, and bore a crop of fruit — the second crop. The same result is often obtained by cutting back the old plant when the first crop is off, and allowing new shoots to grow from the eyes near the base. In practice, however, better results are obtained from the use of young plants,— either seedlings or rooted cuttings.

Mr. Strong spoke of a peculiar experience. One season he planted a large field of tomato plants. The lot was upon a side hill, and sloped to the south. In July a terrific hail storm swept over the district, causing the almost total destruction of this crop throughout that district. Singularly enough, his field, on the southerly slope of a hill, almost entirely escaped injury. From this field he sent to market a forty bushel load of fruit, which brought to him one hundred and sixty dollars. He then again referred to May planting out of tomatoes, and asked if it would be expedient to place temporary boxing around the young plants, to be covered with glass when frost was threatened.

Professor Munson had known of boxes being used as described, and the crop saved by them. But another method was to run a cultivator through all the open ground in the field, just before night; this would induce a more rapid evaporation, which would prevent frost bite.

A stranger stated that on tomato ground made rich with phosphates and other fertilizers, the fruit cracked badly.

Professor Munson had conducted some experiments with this point in view, but had observed no ill effects from heavy fertilizing. Fruits from heavily manured plats were uniformly larger and smoother than from plats less heavily fertilized. It is questionable, however, whether excessive manuring will be found profitable in commercial plantations, as the increase in yield is not sufficient to pay the increased cost of production. In some work carried on at the Cornell University a plat 30x60 feet was given nearly three tons of rich compost; while an adjacent plat, under ordinary commercial treatment was given less than one-fourth as much. The average yield per plant in the former case was but three ounces greater than in the latter.

A stranger said that some tomato plants set out early grew well and attained good size before blooming. But soon after the flowers opened they fell off. He wished to learn why they did not set fruit instead.

Professor Munson replied that not knowing the other conditions he could not explain the result.

The questioner stated his belief that tomato plants could not develop perfect flowers except when in a warm atmosphere.

Professor Munson said that oftentimes plants which have formed fruit in the house, fail to set any after being planted out. We may accept the almost universal principle, that checking plant-growth induces fruitfulness.

Another gentleman inquired whether allowing a plant to become pot-bound would promote fruitfulness.

Professor Munson said that if other conditions were favorable it would. But there is a limit to the power of good influences to secure fruitfulness; for if the other conditions are unfavorable the crop of fruit may fail.

Professor Munson, in reply to a question, said he thought one element of success in growing forced tomato plants in boxes is that the roots are thereby somewhat confined.

LECTURE AND MEETING FOR DISCUSSION.

SATURDAY, March 23, 1895.

A Meeting for Lecture and Discussion was holden today at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair. The following paper was read by the author:

EDIBLE NATIVE FUNGI.

By HON. JOHN M. KINNEY, Boston.

Prejudice is stronger than reason, and it is often impossible to persuade men to do what is manifestly for their own interest, if there is any lingering memory or superstition which attaches a bad odor to the thing we want them to do. The tenacity with which we cling to prejudice is illustrated by nothing better than by the contempt and dread with which the community treats the Fungus family, condemning all varieties as unfit to eat, excepting the *Agaricus campestris* or Common Mushroom.

English and European fungi have been carefully studied and classified and their edible and poisonous qualities ascertained by a few men of science and enterprise. Badham, Berkeley, Cooke, Johnson, Smith, Bell, and Mrs. Hussey, have devoted a great deal of time to the subject, and have published books with profuse illustrations, showing to the eye by color and form what their words fail to convey. No American has, until late years, undertaken to publish any treatise on the subject. Now we have the valuable work of Capt. Julius A. Palmer, Jr., with its fine colored plates, and clear descriptions, which are full and complete, and easy to comprehend, and the United States Agricultural Reports of late years give considerable space to drawings and descriptions, showing that the people are demanding information in this regard.

There is no fruit or vegetable which, in my opinion, possesses the nutritive value of the mushroom. Badham, in his "Treatise on the Esculent Funguses of England" says (p. 136), "I have this autumn myself witnessed whole hundred-weights of rich, wholesome diet rotting under trees; woods teeming with food and not one hand to gather it; and this perhaps in the midst of potato blight, poverty and all manner of privations and public prayers against imminent famine."

It is desirable that a more general interest should be developed in the direction of knowledge of the wild mushrooms. Of course the wealthy can buy the cultivated article in the market, whilst others having the desire for this food are unable to gratify their taste in this direction, from lack of information. This information is easily attained by a little judicious application, and in a short time, exercising reasonable care, a person will be safe and make no mistakes and secure to himself a food product very nutritious and palatable. The supply is abundant. In fact "the woods are full of 'em," and within a short distance of this city, edible fungi can be found in great quantities.

The Italians are great gatherers of mushrooms and dry them for use in the winter. I had the opportunity about thirty years ago, to notice what these people were doing in this way. There was a small paper mill in Wareham, just below the Tremont station, where a number of Italians were employed. One day when driving past, I saw the hillside near the mill covered with old boards on which these people were drying mushrooms by the heat of the sun. It happened that I was at that station when these same people, late in the fall, were making their exodus to the city and they were literally loaded down with dried mushrooms in bags and bundles.

I find that the Italians at the North End are experts in the selection of wild mushrooms, as well as in the preparation of delicious dishes. I have frequently had sent to me from an Italian family, maccaroni cooked with mushrooms, which I consider excellent eating.

In the great pine forests of Plymouth and Barnstable counties, where the deer freely roam protected by law, are immense quantities of the Boletus family. With these I have become more familiar than with any other variety. Some years ago I was induced by a lady friend of mine, to collect a large quantity of these mushrooms to make into catsup, for which she had a recipe. I set boys to work, and got altogether more than two thousand pounds; but for some reason I failed to connect on the catsup, and fermentation setting in, I soon found that I had an excellent mushroom vinegar. With this as a basis, I made a superior table sauce, equal to the famous Worcestershire; indeed, by many people it was considered better, as it had a delicate mushroom flavor, not apparent in the other. Many other varieties

of edible fungi were found in this locality, but I am not so well acquainted with them.

It is an accepted fact that some of the mushroom types are poisonous, whilst others are edible; but the problem to be solved is, which are good and which are bad. It must be understood at the outset, that there are no general rules, capable of universal application, whereby the edible fungi may be at once distinguished from the poisonous. Our task would be an easy one, if such a royal road could be discovered. But unfortunately, every effort to apply general rules has failed, and no possible course remains but to become acquainted with every individual species which we resolve to eat, and at the same time with those we should specially avoid. Therefore it may be proper to remark that there are some features manifested in connection with poisonous or disagreeable fungi, which should be borne in mind, as tending to diminish labor in investigation. For instance it may be concluded that fungi which possess a distinctly disagreeable odor may be discarded at once, as unwholesome. Then again, any kinds, the flesh of which when cut or bruised shows a change of color, especially to a *dark* blue, should be avoided. Even the common mushroom will turn brown when cut, and some of the other edible species, will show a slight change; but it is the immediate and rapid change to a deep blue, which should be accepted as a danger signal. It may be safely understood that any species of which a small fragment when eaten raw is biting or unpleasant, is not worthy of experiment. Another precaution may be added, that such fungi as contain a milky juice which exudes freely on being cut or wounded should not be eaten, without careful determination. Once for all, it must be insisted on that, in order to avoid danger, no fungi should be eaten at random, and only those which after careful examination are found to agree with both figure and description (unless practically well-known) should ever be prepared for the table. No method is so safe as that which consists in mastering the characteristics of a few species, especially when pointed out by one who is practically conversant with them, and increasing the number by experience. There are certainly a great many common species to be found in this country which may be eaten with safety, but if only ten or twelve of these are well known, they will furnish all the variety which an ordinary person will require. Experiments in eating unknown

fungi or those concerning which any doubt exists, should on no account be encouraged. We may not possess so many truly poisonous species as has been supposed, but that we do possess some is an undoubted fact; and it should be remembered as a caution. Thoroughly experienced fungus-eaters seldom experiment on unknown species, but only upon those which are known to be harmless, or which by their natural affinities afford no possible reason for doubt.

Characteristic and accurate figures are a great help in the determination of species, but figures alone are scarcely sufficient for the inexperienced, and should always be supplemented by a reference to the written description. Features of importance may be overlooked in scanning a figure, but these may be emphasized in the description. Moreover there are features which cannot be represented in diagrams, which may nevertheless be very evident in the fungus itself, such as viscidity, odor, and taste.

It is a popular error that a mushroom may be distinguished from a toadstool by the cuticle of the cap. Some persons hold that if the cuticle or skin of the cap (or pileus) can be stripped off readily, then the fungus in question is an edible mushroom; but if it cannot be stripped off, it is poisonous. The cuticle is certainly separable in the mushroom, both wild and cultivated; but in numerous instances it is separable in other species that are certainly dangerous; whereas in some excellent species which are constantly eaten, there is no separable cuticle. I was advised by Capt. Palmer, (a high authority on fungi, whose book on American fungi I have already mentioned), when in doubt as to the safety of any species, to eat a small piece, and the next day to try a larger piece; if no unpleasant results occurred it might be considered edible. I would advise all persons who have an interest in this subject to study his works.

The assumption that fungi of the same species growing in different localities, may be so modified by circumstances as to lose or acquire poisonous qualities, has not been established. One of our most virulent species has undoubtedly been eaten in Russia with no disagreeable results, but there is no evidence that the character of the fungus had changed, whilst there is every reason to believe that the process of cooking adopted was calculated to produce such results. It is very probable that the poisonous principle existing in any fungus as it is grown, may be

neutralized by the use of acids or alkalies. Fungi of the mushroom type grow rapidly, and rapidly decay. Chemical changes take place so readily that it is important that this class of food should be cooked as speedily as possible after it is gathered, before any appreciable change takes place. It is by no means certain that stale mushrooms are innocuous, and in some cases where mushrooms have been accused of producing unpleasant effects in persons of delicate constitutions, it is possible that the cause was not in the mushrooms originally, but was developed by incipient decay.

We would dispel the illusion that the common mushroom is the type to which all edible fungi must conform, and that all others should be compared with it. There are some which have the same flavor, or one closely resembling it, whilst there are others of a totally different kind. Much disappointment is liable to follow if, in all cases, it is expected to meet with the mushroom in some modified form. There is as much difference in the peculiar flavor of different species as there is in the different kinds of flesh. No one would be satisfied if veal tasted like mutton, or roast pork like roast beef; and there is just as much difference in the taste of the edible fungi. In some the taste is perfectly novel, and produces a new sensation; for instance, there is not the least resemblance between the Puffball and the ordinary mushroom. It is in this great variety that much of the charm lies; otherwise it would be better to adhere to the common mushroom than to venture upon others which would be no better than substitutes. In tasting of a new dish, therefore, it is better to forget the old one for the time, and expect to partake of something which has to rest on its own merits, and not on its resemblance to anything else.

As a natural consequence of this variety of flavor, it is essential that each species should be used by itself, and that two or more kinds should not be mixed together, in a sort of hotch-potch, where no particular flavor prevails, but all are reduced to a horrible mediocrity. A professed fungus-eater would no more think of sitting down to a dish composed indiscriminately of half a dozen species, than would a gourmet of mixing his wines, or combining his venison with his salmon and turkey. Much of the excellence of a dish of fungi depends upon the cook, for a bad cook will spoil the best dish that was ever invented. It is no part

of our present design to give special instructions in the art of cooking mushrooms, for there is an art in it which makes all the difference. Frankly, the ordinary domestic cook, without experience, never succeeds well, even with the common mushroom; it requires a kitchen genius to present them at their best. It has been said that "Mushrooms are the gift of Nature, whilst a good cook is the gift of God."

The edible qualities of various Agarics are well known to the common people on the continent of Europe. They eat them freely, and make money by their sale, whilst in Great Britain, scientific men have ventured to a large extent to explore the field and forest in search of additions to the table list. On the continent, eaten fresh, dried, preserved in oil or vinegar or salt, fungi constitute, for weeks together, the food of many people; and in Rome there is an inspector of fungi, who daily examines the supplies which come in from the country, and condemns all that are unsound or unsafe to be thrown away. Curiously enough, the law points out by name our favorite *Agaricus campestris*, as poisonous, and orders it to be thrown into the Tiber. Here again the question of locality occurs, suggesting that climatic, or some other unknown cause, may make a radical change in the fungi, as in the case before mentioned, in which a variety whose poisonous quality here is well settled, is eaten with impunity in Russia, and this opens up a wide field for scientific investigation.

It is commonly supposed that fungi are the consequence of decay, and we do find the greatest number of them on decaying substances; but we find them also on glass, flints, metals, in poisonous solutions, and in pure and undecomposed water.

An instance is given of a blacksmith who threw aside a piece of iron at night, fresh forged, and in the morning found it covered with an Ethalium two feet in length. Gun-barrels and sword-scabbards left in damp, close rooms have been covered with a blue mould in a few days. The rapidity with which many if not all fungi grow baffles calculation; the great Puffball, *Lycoperdon giganteum* will grow as large as a peck measure in forty-eight hours, and specimens of *Agaricus campestris* have developed from the button (which is a bud the size of a pea), to a mushroom as large as a coffee saucer, in a night; but it must not be supposed that all this increase of size in a single night is actual growth. Agarics are many weeks forming under the surface of the ground;

their cells are small and closely packed, and ready to expand when the moisture and heat are favorable. When the auspicious moment arrives, the cells absorb abundant moisture and, stimulated by heat, swell out to their full size.

"Any vegetable productions which can increase so fast and are so omnipresent are worth studying to find out their good and bad qualities; and it is probable that among the poisonous fungi, there are many which are as valuable to the pharmacopœia as others are to the table." This statement, written more than twenty years ago by the late R. Morris Copeland, has been verified by the use of Muscarina. This remedy is an "active toxic alkaloid of syrupy consistence, from *Agaricus muscarius*, or *Amanita muscaria*, or fly agaric, a poisonous mushroom, used in Kamschatka as an intoxicant. The alkaloid is freely dissolved out by water and dilute acetic acid." A full description of the physiological effects can be found in Pattee's "Compend of Materia Medica." The poisonous effects manifest themselves very soon after eating, causing heat and a prickling sensation in the fauces of the throat, with burning, and severe sickness at the stomach. In light cases the sickness is relieved by vomiting before any serious injury is done, but at other times the victim is sick for many days, and occasionally death ensues. In the intoxication produced by the *Amanita muscaria*, ludicrous effects are produced; a talkative person cannot keep silence or secrets; one fond of music is perpetually singing, and if a person under its influence wishes to step across a straw or small stick, he takes strides or jumps sufficiently long and high to clear the trunk of a tree.

The juice of *Agaricus muscarius* will kill flies; the fumes of dried puffball when burned will stupify bees and small animals; even the spores of *Agaricus vellereus* made one experimenter very sick; a few grains of *Amanita verna* will kill a dog. *Russula emetica*, as its name shows, is a violent emetic, and a larger dose will kill.

With so much that is dangerous, there is little real risk attendant on the use of the varied forms of fungi, for they can be easily classified, and are quite distinct in their appearance and effects. There are simple rules which, carefully applied, greatly reduce the chances of mistake, and simplify choice. Any fungus which has a disagreeable smell should be avoided; for, although there are a few bad smelling ones that are good kinds, they are very rare.

It may be asked, what is a bad smelling fungus? It may be answered more easily by saying that a mushroom has a good smell; it has a decidedly earthy or fresh odor, reminding one of cool shady nooks in the forest, amongst the ferns and lichens. To describe the odor in words would be impossible. Find a good mushroom and smell of it, and the standard will be always established. Every good fungus will smell like a mushroom, though often with a difference, but no one will ever call the odor unpleasant or impure. Bad kinds will have a peculiar sharpness in their woody smell, or a dirty smell like decaying flesh, and some are so bad smelling that their presence cannot be endured in a room. If the odor of a fungus is satisfactory look at its color. Nearly all the edible fungi are pleasant colored — white, with delicate tints of rose; light shades of yellow and orange; light brown and gray; but the majority are white, pink, orange, or drab. I have a theory that soon the poisonous alkaloid will be eliminated or neutralized from the dangerous species, so that all mushrooms may be rendered edible and useful, and all risk removed. This opens up a wide field for chemical investigation, and I trust that some chemist may be found competent.

I have not attempted to give a list of the numerous varieties, as this can be much better done by the study of some standard work on American fungi, with illustrations and descriptions, and I would specially recommend the works of Capt. Palmer, for this purpose.

I have endeavored to collect some points of interest to bring to your notice, and hope I have aroused a little more interest in our native edible fungi.

Discussion.

Rev. Calvin Terry said that it appears that there is danger of serious illness, and possible death, if one indulges in this kind of food without some knowledge by which to make a proper selection. We have but one life and it behooves us to get the necessary information before we begin to use anything that is new and strange to us. We need to learn what color distinguishes the wholesome varieties, what peculiar forms are to be selected, and what localities are to be visited to find this delicious food material.

Mr. Kinney said that color is not a sure indication of wholesomeness. The only sure way to learn how to distinguish the edible varieties is to get a book containing full and clear descriptions of this class, with accurately drawn and correctly colored illustrations. Take the book with you into the field, meadow, or woodland, and, having found a living specimen, carefully examine it in all its parts, and having found in your book a picture resembling it, compare the two critically, and see if the description also in the book is applicable to the plant in hand in all respects; but bear in mind that the appearance of the living plant changes as the days of its brief existence go by, and that when it has passed a certain stage decay begins and poisonous qualities are developed. The common mushroom *(Agaricus campestris)*, when ready for use as food, has pink gills, which later become brown and finally black.

Miss Jones said she had seen, in a French book, a statement of what was claimed to be an infallible rule, that if the juice of any mushroom would not quickly discolor a bright silver surface, it was a safe one to use as food.

Mr. Terry suggested that it might be true that there is a difference in the constitution of individuals which allows some persons to eat freely, with safety, of certain vegetables or other foods which are poisonous to others.

Professor George F. H. Markoe said many important discoveries had been made in toxicology; one of which was that all decomposing organic matter develops poisonous alkaloids called ptomaines. In the decay of milk, a peculiar ptomaine is developed and this poison is always the cause of cholera infantum. Every one should be very careful how he or she uses any food which is in a state of decay. In selecting mushrooms for table use, one can safely adopt this rule: every *good* mushroom has a pleasing odor and an agreeable taste. The speaker said that he would be perfectly willing to eat any unknown mushroom, which had no offensive odor, nor an acrid, bitter, or otherwise disagreeable taste.

Mr. Kinney approved Professor Markoe's statements respecting the characteristics of good mushrooms.

Professor Markoe added that we obtain many valuable substances from poisonous plants. The so-called Poison Hemlock *(Conium maculatum)* yields, from leaves and seeds, a narcotic poison which is much used as a sedative and antispasimodc

medicine; and our well-known Tapioca is prepared from the roots or tubers of the Cassava plant *(Jatropha manihot)* although the sap of the plant contains hydrocyanic acid. But in the preparation of tapioca, the heat employed expels the poisonous element. It is a curious fact, that, in Russia, the above mentioned poison hemlock, is eaten with impunity by sheep and goats.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 30, 1895.

A Meeting for Lecture and Discussion was holden at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair.

COMMERCIAL FERTILIZERS IN HORTICULTURE.

By Professor W. H. JORDAN, Director of the Maine State College Agricultural Experiment Station.

Statistics tell us that in 1892 the farmers of the United States purchased 1,500,000 tons of commercial fertilizers at a total cost of $53,000,000. It goes without saying then, that my subject today is an important one. It is also a difficult one. I am often moved to declare, at those times when my thought is concentrated upon its complexities and ramifications, that it is, all things considered, the most unsatisfactory of themes for discussion before a body of practical men.

A very large percentage of the inquiries that come to me as a Station Director, pertain to commercial fertilizers, and to some of these questions I can give immediate and definite replies. But when some farmer interrogates me after this fashion: "What is the best commercial fertilizer sold in the state?" or "What fertilizer should I purchase to use in growing potatoes?" or "Do you regard John Doe's Potato Fertilizer as preferable to James Roe's Potato Manure?" both my regard for the ofttimes sensitive feelings of the fertilizer manufacturer, and my pride in my reputation as one who would like to be called a sound adviser, lead me to return evasive or very general replies. Definite and unmodified replies would be injurious both to my reputation and to the best welfare of the inquirer. Before you today, then, you may expect me to treat this subject in a somewhat general manner.

Two facts handicap a discussion of certain special questions that relate to this subject as viewed from the standpoint of the horticulturist.

First. There is a dearth of exact knowledge that can be universally applied to the use of commercial fertilizers. We have many theories, opinions, and think so's, but altogether too few demonstrations.

Second. There is a perplexing complexity and variation of conditions under which different men are working.

When I first began to cast about in my mind for the lines of thought which I would discuss here today, these two topics at once presented themselves:

First. Fertilizers that we may safely regard as "specifics" for particular crops.

Second. The composition of fertilizers in its relation to the quality of the product.

These two topics are today in the forefront of active thought pertaining to plant nutrition, and it would give me great pleasure at this time to incorporate into a creed of practice well demonstrated facts bearing upon these important considerations. When, however, I came to turn over the records of experimental work upon the relation of different compounds and mixtures of compounds to the development and quality of vegetables and fruits, I found such an absence of data, such conflicting testimony, and, in general, such an unsatisfactory condition of statement, that a decision was at once reached that I would not come here and talk about hypotheses or half-demonstrated theories. There are, however, certain general remarks that with your indulgence I will make in this connection.

In the first place, I am somewhat skeptical in the matter of "specifics" in plant nutrition, at least so far as quantity of product is concerned. It is true that the needs of all plants for food are not just the same, because both the relative and absolute quantities of ingredients that they take up differ, and because some plants thrive with a food supply to which others are more or less indifferent. If by "specific" manuring we mean the supplying of a particular plant with its needed food elements in acceptable forms, so that it will make rapid and generous growth, I have no exception to take to the term, but I hold that the "*needed food elements*" and the "*acceptable forms*" are too

nearly the same for a large proportion of the crops that enter into intensive agriculture to allow any very narrow use of the term specific.

The specific thing to do is to feed the plant generously with what it needs.

I can illustrate my thought no better perhaps, than by referring to the experiments from the results of which the public, at least, has come to believe that nitrate of soda is a specific for tomatoes. These experiments were conducted mostly at the New Jersey and New York (Cornell) Experiment Stations, and upon consulting the conclusions drawn by the experimenters, I find that while nitrate of soda has in some cases a greater influence when used alone than any other single fertilizer, such statements as these are made: First. "Neither nitrate of soda nor muriate of potash alone are profitable tomato manures upon thin soil." (Cornell Bul. 21.) Second. "That the best effect is secured from manuring with nitrate of soda when there is in the soil a sufficiency of the mineral elements phosphoric acid and potash. (N. J. Bul. 63.)" Third. "These conclusions . . . show that *financial profits* from the use of nitrate of soda are also governed by the *quantity applied*, the *method of application* and a *full supply in the soil of the mineral elements*. (N. J. Bul. 79)." What other meaning can be given to these conclusions than this,— that when tomatoes are abundantly supplied with all other elements of growth save nitrogen, the addition of nitrate of soda, containing nitrogen combined as nitric acid (all things considered its most efficient form), greatly promotes growth and vigor. Of very many, if not nearly all, of our cultivated plants, can the same thing be said. Nitrate of soda is a great and almost universal specific for furnishing available nitrogen to crops, as a wide experience shows. That it is peculiarly so for tomatoes or any other small list of cultivated plants I seriously question.

My point is this: Cultivated plants require the same elements of plant food, though in somewhat variable proportions. These elements are found in certain compounds which are very generally useful in plant nutrition. When a crop grower uses one or more of these compounds to supplement his otherwise available supply of plant food so as to secure intensive growth, that compound is for him a "specific" for his conditions.

Turning now, in the second place, to the influence of the composition of the fertilizer upon the product, we enter a field of far too scanty knowledge, and in regard to the information which we have, I freely confess that to me it does not have a desirable definiteness and conclusiveness. Nor is this strange. Quality in vegetables and fruits is dependent upon so many conditions, such as climate, season, the fertility of the soil, rapidity of growth, and manner of handling, that it is difficult to trace the relation between a single cause and its effect. There appears to be no theoretical reason why a vegetable or a fruit may not be materially modified by varying the kind and quantity of its food supply, and, indeed, there are well established examples of this nature. The increased ash content of plants through a liberal supply of easily available mineral food; the greater albuminoid content in certain grasses due to heavy feeding with soluble nitrogen salts; the effect, in certain instances at least, of potassium chloride upon the starch content of the potato; the influence of the proportion of nitrogen to phosphoric acid and potash compounds in fertilizers upon the sugar content of beets; the deterioration of the burning quality of the tobacco leaf because of the influence of muriate of potash in the fertilizer,— are all instances, well enough proven, of favorable or unfavorable results from the manner of feeding the plant. It is entirely reasonable to suppose that the sweetness or acidity of fruits, or the flavor of certain vegetables, may be modified in ways we do not now understand, by the kind and quality of food supplied. Here is a field for continued and painstaking work on the part of investigators in experiment stations.

It appears to me quite certain, however, that much of the influence supposed to be due to the fertilizer is of an indirect rather than a direct nature. I regard the sugar beet as an illustration of this. It does not appear that the depression of the per cent of sugar caused by heavy applications of animal manures, or by an excessive use of nitrogen salts, is due to a direct antagonism of the nitrogen compounds to sugar formation, but rather to the fact that the abundant supply of nitrogenous compounds so intensifies and prolongs the growth of the beets as to prevent the production of the large sugar content which occurs at maturity. So with other vegetables, the rate of growth and the degree of maturity within a given time are important in rela-

tion to quality, and these conditions are controlled in part by the fertilizer used.

But I feel quite sure that what I have said so far you would characterize as consisting of somewhat broad generalizations, so indefinite as to be devoid of much in the way of practical suggestions. Let us, therefore, turn to a side of our subject, which admits of discussion on a safe and well established basis. And I notice, first of all, that stable manure is the main reliance with the horticulturist, especially in forcing house and market garden work. This will doubtless always be the case for several reasons.

First. The organic matter of these manures gives a physical condition which, in its relations to heat and moisture is more favorable to plant growth than can be obtained in any other way.

Second. Such manures cause a soil to become a hotbed of chemical activity.

Third. Animal manures, generally speaking, are a fairly complete and well balanced source of plant food.

We may safely assume then that, in vegetable growing at least, commercial fertilizers will be used principally as a supplement to stable manure. It is with this fact in mind, then, that we will continue our discussion of this subject.

We are now considering commercial plant food,— that which must be purchased,— the nitrogen of which will cost upwards of twenty cents per pound, the available phosphoric acid, seven cents, and the potash five to six cents, when landed where they are to be used. How shall this plant food be purchased, and in what forms? Are the ordinary superphosphates, or even the so-called special manures in the markets, a desirable source of plant food for the horticulturist?

And I remark as a general proposition that the agriculturist, and the horticulturist in particular, can do better than to depend upon the ordinary brands of superphosphates or mixed fertilizers, as at present manufactured, for his commercial supply of plant food. This statement is not offered as a general criticism upon fertilizer manufacturers or upon their goods. While I am not satisfied with the existing conditions of our fertilizer trade in its relation to any class of crop producers, there is no element of blame attaching to either the honorable manufacturer or the farmer. They are both very much the victims of circumstances. The trade has grown into its present means and methods

gradually, molded by competition, the necessity for profit, the relative cheapness of materials, conditions of intelligence or ignorance upon the part of consumers, and, to some extent, by prevailing notions in the scientific world.

Unfortunately, however, (and I say this out of a dozen or more years of experience as an inspector of fertilizers) it is the minority of fertilizer manufacturers who are making a study of the real needs of agriculture so as to meet these needs with the right amount of the best materials. Too many of them are dealing upon the ephemeral basis of selling the least value in plant food, for the biggest price that competition will allow, rather than upon the more enduring foundation of supplying the most useful compounds for plant nutrition in the right proportions. The methods that govern the patent medicine trade have entered too largely into the fertilizer trade. It is too often a matter of skillful advertising, or the canvassing of a shrewd, tonguey agent, rather than a consideration of the real needs of the consumer. The horticulturist, at least, should stand outside these unfortunate conditions, for he, as a rule, is a man who is intelligently studying his business.

In order to get at this matter more in detail, let us consider briefly what fertilizers are and the sources of the materials that enter into them.

The superphosphates of the trade are, as you well know, mostly mixtures, in varying proportions, of three classes of compounds, — those containing nitrogen, phosphates of various kinds, and potash salts. The leading ingredient in the matter of quantity is phosphoric acid, potash standing next in order.

The principal sources of phosphoric acid are bone in its various forms,— raw, steamed, dissolved bone and dissolved bone black, South Carolina and Florida rock phosphates both crude and dissolved, phosphatic guanos, etc. In all these substances the phosphoric acid is combined chiefly with calcium oxide or lime, although one material which is made up mostly of phosphates of iron and aluminum has recently come into some prominence. The availability of phosphoric acid in these several sources of supply is the main point for consideration, and I have this to say, that in so far as it is rendered water-soluble its value is uniform whatever its source. The so-called "reverted" or "citrate soluble" phosphoric acid must also have a practically uniform

value when it consists of phosphate of lime that is truly "reverted," but there are other compounds which are dissolved by ammonium citrate to which the term available should, in my judgment, be applied with caution. Let me explain.

We have recently erected at the Maine Experiment Station a forcing house for the study of certain problems in plant nutrition. For two years we have been investigating the foraging power of a variety of plants for phosphoric acid as obtained from different sources, and among other materials entering into our work is one somewhat peculiar. It is made up of phosphates of iron and aluminum, which in their natural condition were hydrates and insoluble in the citrate solution, but which by the application of heat are rendered anhydrous and soluble in ammonium citrate, though not in water. In the parlance of fertilizer analysis this phosphoric acid is therefore styled reverted and available. The fact is, however (and this is a sad comment on the citrate method for determining the real availability of phosphoric acid), the phosphoric acid in this form does not prove to be highly available, at least under the conditions of our experiments, except in the case of turnips. In our experiments clover, peas, barley, corn, potatoes and tomatoes have not been able, under forcing house conditions, to feed from it readily, whereas, in the case of the clover and peas at least, floats from Florida rock, very little of the phosphoric acid of which is dissolved in the citrate solution, have proven more useful.

The important point in this connection is this: these anhydrous phosphates of iron and aluminum are being used to increase the per cent of so-called available phosphoric acid in some of our mixed fertilizers. To this fact in its relation to the forcing house and the market garden, I shall refer later.

The potash salts imported from Germany are the almost exclusive source of potash in our mixed fertilizers. We have three of these compounds, the chloride or muriate, the sulphate, and lately the carbonate, all of which are soluble in water, and which, for general agricultural uses, we may regard as practically equal in value, and probably so for the special uses of the horticulturist. Commercially the sulphate is more valuable than the muriate.

The commercial sources of nitrogen are greater in number and more varied in character than is the case with either phosphoric acid or potash. No plant-food problem, either commercially or

in practice, demands more careful consideration than does the nitrogen supply.

First. The element is expensive, for it costs nearly three times what the other two do.

Second. It is subject to greater possibilities of waste than any other commercial element of plant food.

Third. It may be, and is, derived in part from inferior sources.

The third and last statement is the one with which we are mainly concerned in today's discussion.

The nitrogen of fertilizers is found to be combined in three general forms, viz.: in nitric acid or nitrates, in ammonia or ammonium salts, and in vegetable and animal substances, which as a class are called organic ammoniates. The only representative of the first class, which enters into the fertilizer trade is nitrate of soda. In this we have the nitrogen as nitric acid, the form adapted *par excellence* for the uses of the plant. We have reason to believe that nitrogen enters the plant largely in this combination, and that other forms are to a great extent changed to this before becoming useful.

Standing next to nitrates in point of value, and perhaps scarcely below, are the ammonium compounds, sulphate of ammonia being the only one entering into the list of fertilizer supplies. This is the most concentrated nitrogenous fertilizer we have, and even though its nitrogen may suffer conversion into nitric acid wholly or in part before being utilized, it takes a place second to nitrate of soda, if at all, only upon theoretical grounds, for in practice it is found to act with entire promptness and efficiency in promoting growth.

When now we come to a consideration of the organic ammoniates actually found in the markets, it is not possible to speak of them all in terms of approval. A fairly complete list of these ammoniates are the following: Dried blood, dried meat, tankage (which may be varied in character and may cover a multitude of sins), ground bone, dried fish, fish scrap, hoof and horn meal, waste hair, waste meal, leather, cotton seed meal, and castor pomace.

These materials are classified as to agricultural value according to their availability, or the readiness with which the nitrogen is carried over (through processes of fermentation and decay) into compounds which the plant can utilize. Judging from this standpoint those organic ammoniates which should be ranked as

desirable are dried blood, dried meat, tankage (consisting of meat and bone), dried fish, cotton seed meal, and castor pomace. I am not ready to place hoof and horn meal in the afore mentioned list, neither shall I include it with certain kinds of tankage, wool waste, hair waste, and leather, which are inferior and should be regarded as frauds in any fertilizer that is put forward for one of good quality.

But you ask, Are these inferior ammoniates, these frauds, actually used in the manufacture of fertilizers? There is credible evidence that they are. Some one now inquires, Are they found in the fertilizers which I buy? That depends. Unquestionably they are bought by somebody, otherwise they would not be manufactured, but whether you buy them or not I am not able to say. Unfortunately if you were to put a sample of the fertilizer you have purchased into the hands of the chemist, he could not answer your question with any degree of certainty.

Doubtless these statements will be regarded as a serious indictment of the fertilizer trade. I do not mean to imply, however, that all brands of fertilizer contain these inferior materials, or to disguise the fact that a vast amount of the best of organic material is mixed into the various brands of superphosphates. I do mean to call attention, though, to the possibilities of purchasing nitrogen unfit for the uses of the horticulturist who is seeking rapid growth and quick returns. Whatever may be said of grass and grain farming, the forcing house and market garden are no place for compounds so inert that they must undergo a long process of "weathering" before becoming useful, and whose purchase in the place of better materials may cause the partial loss of a season's opportunity. The producer of fine vegetables for the city market needs his plant food in forms easily available at once, especially that part of it which he purchases as a supplement to stable manure in order to secure the earliest possible growth.

It is very easy for us to perceive, in the light of these facts, that it is very important, for the horticulturist especially, to adopt such methods of dealing as shall insure the purchase of the right kind of plant food. What shall these methods be? While affirming that the advertised brands of fertilizers furnish, in a certain percentage of cases, which may be greater or less, plant food of the very best quality, I will offer for your consideration two

methods, the adoption of either of which would in my judgment constitute a progressive step.

First. Home mixing of chemicals.

Second. An order to a manufacturer in whom you have entire confidence, for a mixture of chemicals which you shall specify. Either of these methods gives an opportunity to select materials, the quality of which is known, with a good degree of assurance. Nitrate of soda and sulphate of ammonia may be adulterated, but when taken in an unmixed condition, the value and extent of the adulterations are easily detected. Dried blood and dried and ground meat, each possesses a somewhat characteristic appearance, an important variation from which attracts attention. Tankage, to be sure, may, if purchased, still give an opportunity for deception, but if it can be inspected as such, the presence of wool and hair waste and leather are much more easily discovered, than when mixed with the larger bulk of phosphatic and potash materials, associated with it in mixed fertilizers.

The nature of phosphoric acid compounds may also be known when purchased as a plain superphosphate. Dissolved bone black and acid phosphates are easily recognizable by their physical appearance, but if not, chemistry is perfectly competent to determine whether they contain any compounds of questionable value. In fact, when a plain superphosphate is bought on a guarantee there is very little reason to expect any deception as to the amount and quality of the phosphoric acid obtained. Certainly in this way it is possible to avoid the unwitting use of these phosphates of iron and alumina of which I have made previous mention, and which we must now regard as undesirable for use in forcing the growth of vegetables.

I urge upon the horticulturist then, some method of buying his plant food that will allow him to select it with reference to its quality. Why shall he not do this? The dairyman is very particular about the quality of his animal foods, and why should not the plant feeder be equally careful. Fertilizers cost more per ton than bran or meal, and a season's opportunity in vegetable production is worth as much as cows, milk, and butter. You cannot deceive the plant any more than you can the cow. The cow and plant alike refuse to yield generous returns without proper nourishment, and so I am unable to understand why plant food should not be obtained in ways that admit of the same close inspection of materials as is the case in the cattle food trade.

There is another reason why I would not buy the ordinary brands of superphosphates, as a supply of plant food for the forcing house and market garden, viz.: The three ingredients, nitrogen, phosphoric acid, and potash are not combined in the right proportion for use under these conditions. Not long ago I took occasion to ascertain the proportion of nitrogen to available phosphoric acid and potash soluble in water in fifty-eight brands of fertilizers sold in Maine. I found that for each 100 pounds of nitrogen these goods contained on the average 460 pounds of available phosphoric acid and 120 pounds of potash. These proportions are very different from those existing in the quick growing food plants most common to horticulture. I find that the average proportions in twelve of the most important vegetables is, nitrogen 100, phosphoric acid 50, and potash 160. This shows that in the average fertilizer the ratio of phosphoric acid to nitrogen is nine times greater than it is in the average of twelve vegetables. The ratio existing between the nitrogen and potash is not greatly different in the two cases. This means then, that if the fertilizer is to correspond to what the plant uses it must be compounded quite differently from the average formula found in the market: in no case, out of the fifty-eight fertilizers examined, did I find a ratio of nitrogen to phosphoric acid greater than one to two, which would give a proportion four times less than in the crops distinctively horticultural.

But should a fertilizer contain the elements of plant food in the same relative proportions that they are found in the plant? Perhaps never just the same — perhaps sometimes very widely different — but the degree of approximation to this must depend upon circumstances. It is true in the abstract that a crop grower purchases plant food most wisely when he buys just enough of certain ingredients to make good the deficiencies of his home resources. What those deficiencies are is determined by several factors, the important ones being the soil, the crops grown in the rotation, and the kind and quantity of products sold. I would never advise the general farmer to adopt as a principle of action special fertilizers whose formulas are based wholly upon the composition of the crops he is to produce, for to do this is to ignore the greatly varying capacities of soils, the unlike feeding power of different plants, the use of legumes as a source of nitrogen supply,—is to ignore, indeed, all but one of those factors

which determine the farmer's plant food deficiencies. For certain farmers in the Connecticut Valley, whose alluvial soils cry out for potash, to buy the same fixed formula as the Maine farmer, whose granitic soil is, by the processes of weathering, yielding its annual quota of available potash, or for the grain producer, whose environment admits of the successful use of clover in the rotation, to purchase as much nitrogen as the farmer located where clover does not thrive, is to adopt a "rule of thumb" method that does not belong to the highest order of farm management. I grant, yes, I do more than this, I assert, that with the horticulturist, who is engaged in intensive production, the case is different. In the forcing house and garden, conditions are almost if not entirely artificial, so far as it is a question of feeding the plant. Even in the garden, the variations in the natural food supply are obscured by the greater amount of available material supplied by the generous applications of stable and commercial manures. While we must still depend to an extent upon the chemical activities whose field of action is the rich garden loam and the artificial soil of the forcing house, we are comparatively independent of those processes of weathering which are of so much importance as a means of fertility in the long rotations of the grass and grain farm. In the production of grass, grain, and even the ordinary hoed crops, the natural capacity of the soil, or its annual contribution of available plant food is an important, and even a controlling, factor; but in certain lines of horticultural work it is a minor factor. In horticulture and the forcing of vegetables, the plant is the one thing to be considered, and after we have made the physical conditions and water supply what they should be, we may safely proceed to feed the plant as if its sole supply of nourishment is what we furnish it.

The considerations stated in the foregoing lead me to the conviction then that the fertilizers ordinarily found in the markets are not economically adapted to certain lines of horticultural work. The proportions of ingredients in these goods is such that it is necessary to purchase too much of one in order to obtain enough of others. For use under the conditions to which I have so far confined this discussion, I am convinced that on the average the amount of phosphoric acid used should at least not be in excess of either the nitrogen or potash, or, in other words, for market garden and forcing house use, the proportions of

nitrogen and potash should be greater than is found in the established brands of mixed fertilizers now offered in the market.

This desirable change can be secured, as I have already indicated, by the purchase of chemicals to be mixed at home, or by coöperating with some manufacturer in whom you have confidence. Under right conditions either method may be successful. It would be foolish to ignore the manufacturer, because the wisdom of a division of labor holds good here as elsewhere. But we should keep him in his place, which is to supply us with what we wish to purchase, without even supposing that he can determine our needs. These we must discover for ourselves, aided by the investigations and results of others. There has been too much of a feeling on the part of the agricultural public, that somehow or other the manufacturer is able to discern the needs of farmers, because of a higher range of knowledge to which he has access; that somehow or other the same knowledge enables him so to conjure with materials obtained from unusual sources that he is bound to offer, if not the right thing, a very good thing, which rises above the common everyday facts and means of agricultural practice.

The crop grower should never forget that the manufacturer is studying commercial opportunities chiefly, and that he is first of all a business man, and is rarely competent either from the practical or scientific standpoint to guide in the practice of plant feeding. His province is to study the markets and processes of manufacture, and in these directions he must lead; but in respect to the use of plant food the farmer should lead, and the manufacturer should buy and manipulate to suit the demand that comes up to him from the consumer.

Commercial fertilizers, as they exist in the markets today, are a curious medley. In their composition the fact is recognized that nitrogen, phosphoric acid, and potash, are the three constituents of plant food, one or more of which is likely to be needed to increase fertility; but beyond this they fail in most instances to embody any distinct principle or rule of practice. The so-called special manures of different manufactures, designed for the same crop, differ almost as widely as do the brands designed for general use. Order will sometime come out of this chaos, but chiefly through the efforts of those who use the various preparations of plant food. This will not be done, however, until trade names pass

into "innocuous desuetude," and plant food in its various forms, is both bought and sold by the names it properly bears, as one buys and sells sugar, iron, or any other standard commodity. And the time is coming when the general farmer, or the market gardener, will order of the dealer so many pounds each of nitrogen, phosphoric acid, and potash, just as now he purchases seeds and foods.

As a suggestion to those, especially market gardeners and those managing forcing houses, who are inclined to mix their own fertilizers or to ask for a definite mixture from the dealer, I offer the following combinations, which may be varied *ad libitum*.

(1)

Nitrate of soda	15 per cent	nitrogen	350 lbs.
Dried Blood	10 "	"	700 "
	2 "	phosphoric acid	
Acid Phosphate	15 "	" "	700 "
Sulphate of Potash	50 "	potash	250 "

This combination would contain the following:

Nitrogen	122 lbs.	or 6.1 per cent.
Phosphoric acid	119 "	" 5.9 "
Potash	125 "	" 6.2 "

(2)

Sulphate of Ammonia	20 per cent	nitrogen	250 lbs.
Cotton seed meal	6.75 "	"	1000 "
	2.75 "	phosphoric acid	
	1.75 "	potash	
Acid Phosphate	15 "	phosphoric acid	550 "
Muriate of Potash	50 "	potash	200 "

This combination would contain the following:

Nitrogen	117 lbs.	or 5.85 per cent.
Phosphoric Acid	110 "	" 5.5 "
Potash	117 "	" 5.85 "

(3)

Nitrate of Soda	15 per cent	nitrogen	300 lbs.
Dried Blood	10 "	"	600 "
	2 "	phosphoric acid	
Dissolved Bone	14 "	" "	800 "
	2.5 "	nitrogen	
Sulphate of Potash	50 "	potash	300 "

This combination would contain the following:

Nitrogen	125 lbs.	or 6.25 per cent.
Phosphoric acid	124 "	" 6.2 "
Potash	150 "	" 7.5 "

Special attention is called to mixture No. 2, which, owing to the low price of cotton-seed meal, would furnish plant food more cheaply than either of the other combinations.

It is very easy to see that by varying the quantities of chemicals the mixture may be made to contain more of one ingredient and less of others.

Just here the question will arise,— "How shall I know what combination to use?" Only by observation and study. You should not adopt the successful rule of practice of some other man unless your conditions are entirely similar to his. And the only method admitting of intelligent and reliable observation is when fertilizing materials are applied with a full understanding of what they contain, so that it is possible to trace cause and effect. If you purchase these ingredients separately, you are then able to apply them singly, or combined in different forms and in different proportions. In this way you may attain a degree of knowledge applicable to your own business that will never be possible if you continue to buy the fixed formulas of the markets. This may be a hard doctrine, but it is nevertheless the means of salvation.

The agricultural public should study carefully the results of experiment station investigations, for in this way much will be learned, which, as general principles, will be important to every man's practice. But never will experiment stations relieve the individual of the necessity of making a close study of the needs and methods of his own environment.

Principles, the practitioner may be taught by others,— the right relation of the principles to his own business he must, in part at least, discover for himself, and in no field is there a larger opportunity for this than in the purchase and use of commercial fertilizers.

Discussion.

A gentleman remarked that some persons not familiar with plant culture regard all commercial fertilizers as similar in character to alcohol,— as only stimulants. But the truth is they are really plant food — as positively so as any stable manure. This has been proved by many careful experiments, including those by sand culture and water culture. As no healthy child could be reared on alcohol, so no plant life can be long sustained without being supplied with plant food.

William C. Strong asked whether the phosphates of iron and aluminum were undesirable.

Professor Jordan replied that for the horticulturist they are; as in his cultural work he had found their action to be too slow. But in farming operations, especially on land about to be laid down to grass, they may be valuable for their staying qualities, as they require much of "Nature's weathering" to develop their useful conditions.

Benjamin P. Ware asked what was meant by the terms "available" and "reverted" phosphoric acid.

Professor Jordan answered that those expressions represent an important fact. Available phosphoric acid — if such in reality — is that which can be rapidly taken up by growing plants. The term "available," as used in connection with fertilizer analysis, means the sum of the water-soluble and reverted (or citrate-soluble). "Reverted" should really be applied only to "that which has once been soluble in water, but by chemical change has gone back;" but is now used in the sense of "that which is soluble in ammonium citrate."

The question was asked, What is the relative value of wool-waste and hair-waste as compared with other materials in commercial fertilizers?

Professor Jordan replied that although rich in nitrogen, both are very slow to yield their fertilizing elements, unless they are broken down by chemical treatment or some process other than Nature's weathering; even then there are other sources which are preferable for the horticulturist. Cotton-seed meal, for this purpose, is this year sold in Maine at twenty dollars per ton. This yields six and three-fourths per cent of nitrogen; two and three-fourths per cent of phosphoric acid, and one and three-fourths per cent of potash. At the price named one can now get a supply of nitrogen from cotton-seed meal more cheaply than from any other source. (In the first two formulas given in the paper read today, the term acid phosphate refers to Florida rock, South Carolina rock, or bone-black, each in a dissolved state.)

The next question asked was, What fertilizing elements are derived from bones? To this Professor Jordan replied that bone furnishes phosphoric acid and nitrogen. If bones are steamed, that process takes away a portion of the nitrogenous matter, thus reducing the proportion of nitrogen in the fertilizer.

Mr. Ware expressed his delight that the essayist had given so outspoken a talk upon commercial fertilizers. Public speakers generally seem to be a little delicate about speaking their mind on this subject, out of regard for the feelings of manufacturers. The milkman who is wise supplies his cows with well balanced rations. All cultivated crops, to make the best growth, require well balanced rations as much as cattle. The soil of Massachusetts is generally deficient in potash, but the manufacturers of commercial fertilizers persist in putting on the market compounds that are made up of materials in wrong proportions — too much phosphoric acid and too little potash. Why should not our farmers and horticulturists purchase the ingredients which are needed in their soils and mix them on their own premises, in the proportions required in each case? All the conveniences necessary for this work are a barn-floor, a shovel, and a man; and proper mixing can be done for fifty cents per ton. Last year the speaker purchased his own selection of ingredients for what would be equivalent to ten tons of mixed fertilizers of which the price was forty dollars per ton; but he paid only about one-half the cost of so-called complete fertilizers. By following this plan one gets what he needs with no useless surplus, and will save at least one-third of the cost of an unknown mixture. In the paper read here today, Professor Jordan has touched upon one of the most important subjects to all who cultivate the soil; he has spoken the truth, openly and fearlessly, and it has been a great satisfaction to hear him state the facts.

Professor Jordan thanked Mr. Ware for so heartily indorsing his statements. He then said he wished to leave upon the minds of all present, this distinct impression: he would have a method of mixing fertilizing compounds with special regards for the needs of the different localities where they were to be used. If cultivating wheat in Pennsylvania, he would not buy so much nitrogen, because in the rotation of crops, clover would furnish that. But he would especially have regard paid to the requirements of market gardeners and forcing house men, whose soils are in so artificial a condition, that the gardeners practically furnish all the plant food their crops get or require. In such case the culturist needs to know what ingredients are necessary for each crop, and the relative proportions of each. He cannot find such mixtures in the market. His only course then, is to buy the

several materials and mix them himself, or, place an order for such mixtures with a reliable manufacturer. Professor Jordan stated that at present the manufacturer dictates to the farmer what he shall purchase, whereas the reverse should be true.

The question was then asked, What is the relative value of the liquid manure, and the solid product from stables?

Professor Jordan had no doubt that the loss, by the waste of the liquid manure of stables, was in many localities fully equal to the amount paid for artificial fertilizers. He believed that where the animals were well fed, the liquid manure constituted one-half or more of the commercial value of the whole product; but this valuable material is, by many farmers, allowed to run to waste.

To a question concerning the value of sulphate of ammonia, Professor Jordan replied that he regarded it with favor. It contains about twenty per cent of nitrogen. It is less likely to leach rapidly from the soil than nitrate of soda, and is sufficiently available for quick growing crops.

The question was asked, How does gas-lime rank as fertilizing material? In answer Professor Jordan said that when first received from the gas works, it consists chiefly of lime, with some addition of the sulphate, the sulphite, and the sulphide of lime; the last named, especially, is poisonous to vegetation, but if exposed a while in the open air, the poisonous properties disappear. The remaining lime, if put into the soil is of use by its chemical action upon inert matter there present, converting it into plant food.

In reply to a question whether potash is a necessary element of plant food, Professor Jordan said that if there is anything pretty well proven, it is that plants must have potash. Plants undoubtedly contain some potash which is in excess of a minimum portion that is absolutely essential. There is a minimum which plants must have, and which no other compound can replace.

CONTENTS.

PAGE

PREFATORY NOTE, ... 3

BUSINESS MEETING, January 5, 1895; Address of President Kidder, pp. 5, 6; Appropriations for 1895, pp. 6, 7; Appointment of Treasurer and Secretary, 7; Appropriation for William Castleton, 7; Report, inexpedient, on Lectures by W. H. Gibson, 7; Committee on School Gardens and Children's Herbariums, 7; Announcements by Committee on Publication, 8; Report of Chairman of Committee on Gardens, 8; Committee on Board of Trustees, 8; Report of Committee on Revision of the Constitution and By-Laws, 8, 9; Two members elected, ... 9

MEETING FOR LECTURE AND DISCUSSION, January 12; Days with our Birds, by Mrs. Kate Tryon, ... 9–13

MEETING FOR LECTURE AND DISCUSSION, January 19; Flower Pots, by A. H. Hews, pp. 14–21; Discussion, ... 22

MEETING FOR LECTURE AND DISCUSSION, January 26; Fungous Diseases of Ornamental Plants, by Byron D. Halsted, with three plates, pp. 22–33; Discussion, ... 34, 35

BUSINESS MEETING, February 2; Annual Report of Treasurer read, p. 35; Supplementary Report from Committee on School Gardens, etc., 35; Report of Committee on Large, Old, or Interesting Trees, with volume presented, 35, 36; Vacancy in Committee on School Gardens, etc., filled, 36; Committee on Board of Trustees, 36; Six members elected, . 36

MEETING FOR LECTURE AND DISCUSSION; Hardy Plants and Shrubs, by J. Wilkinson Elliott, pp. 36–53; Discussion, ... 53, 54

MEETING FOR LECTURE AND DISCUSSION, February 9; Glass Houses, by Henry W. Gibbons, with two plates, pp. 55–74; Discussion, ... 74, 75

MEETING FOR LECTURE AND DISCUSSION, February 16; Economic Entomology, by Edmund B. Southwick, pp. 76–82; Discussion, ... 82–85

MEETING FOR LECTURE AND DISCUSSION, February 23; Experimental Evolution Amongst Plants, by Prof. L. H. Bailey, pp. 86–99; Discussion, . 99, 100

BUSINESS MEETING, March 2; Contributions to Memorial to Francis Parkman, pp. 100, 101; Decease of J. J. Thomas and F. B. Hayes announced, 101; three members elected, ... 101

MEETING FOR LECTURE AND DISCUSSION; A Talk on Gardens, by David Hill Coolidge, Jr., pp. 101-114; Discussion, ... 114, 115

MEETING FOR LECTURE AND DISCUSSION, March 9; Budding and Grafting, by Jackson Dawson, pp. 115-136; Discussion, ... 136

MEETING FOR LECTURE AND DISCUSSION, March 16; Some Notes on Tomatoes, by Prof. W. M. Munson, pp. 136-146; Discussion, ... 146-148

MEETING FOR LECTURE AND DISCUSSION, March 23; Edible Native Fungi, by Hon. John M. Kinney, pp. 149-156; Discussion, ... 156-158

MEETING FOR LECTURE AND DISCUSSION, March 30; Commercial Fertilizers in Horticulture, by Prof. W. H. Jordan, pp. 158-172; Discussion, . . 172-175

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1895.

PART II.

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PRINTED FOR THE SOCIETY.
1896.

TRANSACTIONS

OF THE

ssachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, April 6, 1895.

ıly notified Stated Meeting of the Society was holden at o'clock, the President, NATHANIEL T. KIDDER, in the chair.

iam C. Strong, Chairman of the Committee appointed at ıt meeting to prepare a memorial of the late John J. s, an Honorary Member of the Society, presented the ng report:

T OF THE COMMITTEE ON THE DEATH OF JOHN J. THOMAS.

not given to men engaged in the quiet industry of horti- to arrest attention and startle the world by brilliant deeds overies. The common lot with us is this, that we run our ace with average success, and then are gathered unto our . Yet it is also true that such as these, who have with aithfulness and marked ability acted well their part, have f greatest service to mankind, and are entitled to lasting brance.

ı a man was John J. Thomas of Union Springs, N. Y., eased from his long life of earthly usefulness on the 22d of ary last. Born in 1810, on the shore of the beautiful a Lake, in the heart of the great agricultural and horti- l Empire State, he identified himself with these interests at ly age, and soon took rank as a leader. In the year 1839 ame a regular contributor to the "Cultivator," published at

Albany, and upon the establishment of the "Country Gentleman" by Luther Tucker in 1853, he became associate editor, and held this important position for more than forty years, until compelled by ill health to resign in August last. During this long period he was unwearied in his writings, giving practical instructions in cultivation and suggestions as to buildings and farm machinery, with drawings from his own pencil, and replying to questions with unvarying patience and skill. During the same period he wrote "The American Fruit Culturist," a most comprehensive and authoritative work, which will be of enduring value; also a volume on "Farm Machinery," besides editing the nine volumes of "Rural Affairs," extending over twenty-seven years, their contents being indeed, chiefly from his pen and their many illustrations chiefly from his pencil. These writings were far from being the speculations of a theorist but rather were a record of the observation and experience of a man who came into actual contact with the soil. With him theory and practice went hand in hand. The smoothing-harrow, the pruning shears, the sliding gate, jarring of plum trees for the curculio, sanitary arrangements for outhouses, and a multitude of other methods which he devised, were all suggested by his own necessities as an extensive orchardist and nurseryman. It was for this reason that his opinions were regarded as of such practical value and were so constantly sought and prized.

It is not easy to estimate the wide influence which Mr. Thomas thus exerted throughout the country. But his interest was not limited to rural pursuits. His was a well-rounded character, active in all social, educational, moral, and religious questions of the day. With uniform kindliness, sterling integrity, and recognized sagacity, he gave expression to his views and widely influenced public opinion. When some great military captain is gone we recount his brilliant deeds of arms. When an eloquent statesman has run his course we magnify his masterly service. Shall we put a less value upon the work of him who in the quiet and unobtrusive walks of life has yet been a mighty power for good in all our wide land?

Mr. Thomas was elected an Honorary Member of the Massachusetts Horticultural Society in 1856. In the closing of this earthly life of our fellow-worker and friend this Society desires to express to his family its deep sympathy with them in their loss. May it not also join with them in grateful acknowledgment to the Author

ing in the remembrance of the noble and useful life of ıer?

WILLIAM C. STRONG,
O. B. HADWEN,
ROBERT MANNING, } *Committee.*

emorial was unanimously adopted.

nnual Report of the Committee on Plants was read by the y, accepted, and referred to the Committee on Publication.

President, as Chairman of the Executive Committee from that Committee a recommendation that the Society ate $50 to defray the expense of the first volume of graphs and Descriptions of Old Trees of New England," by the Committee on Large, Old, or Otherwise Interest-s. The appropriation was unanimously voted.

nendments to the Constitution and By-Laws, ordered by ty vote, at the Stated Meeting on the first Saturday in to be entered on the records, came up for further action. C. Strong moved that the Constitution and By-Laws be *de novo*, and be amended according to the report of the of the Committee on that subject, with certain changes e proceeded to state. The majority report of the ee on the Constitution and By-Laws, as thus amended, twice, and by a majority vote ordered to be entered on ds, and laid over for consideration at the Stated Meeting first Saturday in July. It was also voted that these l amendments be printed and distributed.

following motion, offered by Leonard Thompson, was usly carried:

the plan of the Rumford Historical Association in erecting marking the spot of the discovery of the Pecker, or, later Baldwin apple is approved as worthy by this Society.

llowing named persons, having been recommended by the ve Committee for membership in the Society were on ly elected:

MRS. C. S. HATCH, of North Cambridge,
Professor JAMES F. BABCOCK, of Boston,
LIVINGSTON CUSHING, of Weston,
C. SIDNEY WALDO, of Jamaica Plain.

Upon recommendation of the Executive Committee,

JOSEPH JEFFERSON, of Buzzard's Bay,

was elected an Honorary Member of the Society, and

Professor BYRON D. HALSTED, of New Brunswick, N. J., was elected a Corresponding Member.

Adjourned to Saturday, May 4.

BUSINESS MEETING.

SATURDAY, May 4, 1895.

An adjourned meeting of the Society was holden at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair.

The following named persons, having been recommended by the Executive Committee as members of the Society, were on ballot duly elected:

DUDLEY L. PICKMAN, of Boston,
GEORGE H. LYMAN, of Wareham,
GEORGE P. GARDNER, of Boston.

The Secretary read a letter from Mrs. Mary H. Thomas, acknowledging the receipt of the memorial of her husband, John J. Thomas, adopted by the Society at its last meeting, and expressing the grateful appreciation of it by the family.

Also a letter from Professor Byron D. Halsted, acknowledging the receipt of his Diploma as a Corresponding Member of the Society, and thanking the Society therefor.

Also a letter from William J. Stewart, President of the Gardeners' and Florists' Club of Boston, inviting the members of this Society to attend a meeting of the club on the evening of Tuesday, the 7th instant, when Mr. Henry O'Meara would read a paper on "The Poetry of Flowers."

Adjourned to Saturday, June 1.

BUSINESS MEETING.

SATURDAY, June 1, 1895.

An adjourned meeting of the Society was holden at eleven o'clock, Vice President CHARLES H. B. BRECK in the chair.

brarian laid before the Society a copy of "L'Horticul-
s les Cinq Parties du Monde," a gift to the Library from
ıor, Charles Baltet, Président de la Société Horticole,
ıne, et Forestière de l'Aube, Troyes, France, and moved
thanks of the Society be presented to M. Baltet for the
ıis most important work, which motion was unanimously

eeting was then dissolved.

BUSINESS MEETING.

SATURDAY, July 6, 1895.

y notified stated meeting of the Society was holden at
clock, Vice President C. H. B. BRECK in the chair.

tion of Ex-President William C. Strong, it was voted to
he consideration of the amendments to the Constitution
Laws, which received a majority vote at the Stated Meet-
ıe 6th of April and were laid over for consideration at this
and they were finally adopted as reported by the Com-

rned to Saturday, August 3.

BUSINESS MEETING.

SATURDAY, August 3, 1895.

djourned meeting of the Society was holden at eleven
Vice President C. H. B. BRECK in the chair.

Chair announced the following named persons as the
ee to nominate candidates for Officers and Standing Com-
or the next year, appointed by the President agreeably to
titution and By-Laws:

WILLIAM H. SPOONER, *Chairman*,
JAMIN M. WATSON, Jr., PATRICK NORTON,
UEL HARTWELL, HENRY W. WILSON,
JAMIN P. WARE, C. MINOT WELD.

The following named persons, having been recommended by the Executive Committee as members of the Society, were on ballot duly elected:

JOHN T. BROWN, of Newburyport,
CHARLES H. SOUTHER, of Jamaica Plain,
RICHARD F. BARRETT, of Concord.

Adjourned to Saturday, September 7.

BUSINESS MEETING.

SATURDAY, September 7, 1895.

An adjourned meeting of the Society was holden at eleven o'clock, the President, NATHANIEL T. KIDDER in the chair.

William H. Spooner, Chairman of the Committee to nominate candidates for Officers and Standing Committees for the year 1896, presented a printed list. This report was accepted and it was voted that the Committee be continued and requested to nominate candidates in place of any who might decline before the election.

Mr. Spooner announced the decease of Benjamin P. Cheney, and moved the appointment of a Committee to prepare an expression of the Society's regard for him. The motion was carried, and the Chair appointed as that Committee, Benjamin G. Smith, Benjamin C. Clark, and Walter Hunnewell.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, October 5, 1895.

A Stated Meeting of the Massachusetts Horticultural Society, being the annual meeting for the choice of Officers and Standing Committees was holden at eleven o'clock, the President, NATHANIEL T. KIDDER, in the chair.

Secretary stated that the meeting had been duly notified to mbers of the Society, agreeably to the Constitution and s.

am H. Spooner, Chairman of the Nominating Committee, d that that Committee had nominated Frederick S. Davis mber of the Committee on Flowers in place of Walter H. , who was unable to serve.

eably to the Constitution and By-Laws the Chair appointed Hartwell, James Wheeler, and A. Chandler Manning, a tee to receive, assort, and count the votes given, and he number.

notion of Mr. Spooner it was voted that the polls remain r two hours. The polls were opened at twelve minutes ven o'clock.

amin G. Smith, Chairman of the Committee appointed at meeting to prepare a memorial of Benjamin P. Cheney, d the following:

amin Pierce Cheney was one of New England's noblest nd was an honored and respected member and benefactor of ssachusetts Horticultural Society. He was born in New hire; the personal friend and admirer of Daniel Webster, ented to the State of New Hampshire the finest bronze of the departed statesman ever executed. He was one of gentlemen, members of the Massachusetts Horticultural , who presented the three beautiful statues of Flora, a, and Ceres which adorn this building. He was a member Finance Committee from 1867 to 1880 inclusive. He was the most successful business men of our time. His gener- ithout ostentation through his long and successful business s fidelity, his urbanity, and the uniform consistency of ter for which he was distinguished, have secured for him a lace in the estimation of his fellow citizens. He was t in business and attached to him his numerous employees, of whom remained with him during his long business life. tter evidence of his honorable course can be given. We new him thoroughly can testify to his princely gifts wn to the public; he never sought but avoided notoriety in sing his benefactions; thousands of dollars at a time were by him for worthy objects unknown to the world. He

was the architect of his own fortune; self-reliant he depended upon his own judgment in making his investments. With all his activity he found time to cultivate his intellectual endowments, with which he was unusually gifted.

His view of life and duty was broad; his tastes and conversation refined. His was a well-balanced and symmetrical nature. His conversational powers were of the highest order. It was a pleasure to listen to him, and those who had the pleasure of his acquaintance and friendship can never forget him.

Resolved, That in the death of Mr. Cheney not only this Society but the whole community suffer a severe and irreparable loss.

Resolved, That these sentiments of respect and affection, with the earnest expression of sincere condolence be communicated to the bereaved family of the deceased.

BENJAMIN G. SMITH,
BENJAMIN C. CLARK,
WALTER HUNNEWELL, } *Committee.*

The memorial was unanimously adopted.

The President, as Chairman of the Executive Committee, reported a recommendation that the Society make an additional appropriation of $200 for the Flower Committee the present year. The report was accepted and the appropriation was voted.

The following named persons, having been recommended by the Executive Committee as members of the Society, were upon ballot duly elected:

WILLIAM S. KEMP, of Brookline,
JOHN CROWLEY, of Dedham,
AMORY A. LAWRENCE, of Boston,
AMOS A. Lawrence, of Boston,
ORLENDO W. DIMICK, of Watertown,
MRS. I. TISDALE TALBOT, of Boston.

CHARLES BALTET, Président de la Société Horticole, Vigneronne, et Forestière de l'Aube, Troyes, France, was upon recommendation of the Executive Committee elected a Corresponding Member of this Society.

polls were closed at twelve minutes past one o'clock, and
ommittee to receive, assort, and count the votes, and report
mber given, reported the whole number to be one hundred
ne, and that the persons named on the ticket reported by
ominating Committee had a plurality of votes and were
l.

report of the Committee was accepted, and the above
oned persons were, agreeably to the Constitution and By-
declared by the President to have a plurality of votes and
lected Officers and Standing Committees of the Society for
ar 1896.

ourned to Saturday, November 2.

BUSINESS MEETING.

SATURDAY November 2, 1895.

last meeting of the Society adjourned to today, and the
ers present were called to order by the President, but no
n was present, and the meeting

ourned to Saturday, December 7.

BUSINESS MEETING.

SATURDAY, December 7, 1895.

adjourned meeting of the Society was holden at eleven
, the President, NATHANIEL T. KIDDER, in the chair.

President, as Chairman of the Executive Committee,
ed a recommendation from that Committee that the Society
he following appropriations for Prizes and Gratuities for
ar 1896, viz.:

Plants,	$2,000
Flowers,	2,600
Fruits,	1,800
Vegetables,	1,150
Gardens,	500
Total,	$8,050

The report was accepted, and, agreeably to the Constitution and By-Laws, was laid over for final action at the Stated Meeting of the Society on the first Saturday in January, 1896.

The President further reported from the Executive Committee a recommendation that the Society appropriate $300 for the Committee on Lectures and Publication, this sum to include the income of the John Lewis Russell Fund. This report was accepted and laid over until the first Saturday in January.

John G. Barker, Chairman of the Committee on Gardens, made a partial report, being the awards of Prizes and Gratuities made by that Committee, and asked for further time to prepare the remainder of the report. The report, so far as made, was accepted and further time was granted.

E. W. Wood, Chairman of the Committee on Fruits, read the Annual Report of that Committee, and also his report as Delegate to the State Board of Agriculture.

Joseph H. Woodford, Chairman of the Committee of Arrangements, read the Annual Report of that Committee.

Arthur H. Fewkes, Chairman of the Committee on Flowers, read the Annual Report of that Committee.

Azell C. Bowditch, Chairman of the Committee on Plants, read the Annual Report of that Committee.

These five reports were severally accepted and referred to the Committee on Publication.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

ROBERT D. IRELAND, of Winthrop,
GEORGE M. ANDERSON, of Milton,
CHARLES W. HALLSTRAM, of Boston,
EDWARD HATCH, of Boston,
H. FISHER ELDREDGE, of Boston,
HON. EDWARD P. SHAW, of Newburyport,
JAMES E. ROTHWELL, of Brookline,
ALEXANDER MONTGOMERY, of Natick,
JOSEPH W. HOWARD, of Somerville,
MRS. ELIZABETH S. CHENEY, of Wellesley,
GEORGE A. GARDNER, of Boston,
MICAJAH PRATT CLOUGH, of Lynn.

The Secretary laid before the Society a letter from Mrs. izabeth S. Cheney to Benjamin G. Smith, Chairman of the mmittee to prepare a memorial of the late Benjamin P. Cheney, knowledging the receipt of the memorial and returning heart- lt thanks therefor, from herself and family.

Also a letter from Charles Baltet, of Troyes, France, acknowl- lging the receipt of the notice of his election as a Corresponding lember of the Society, expressing his pleasure at this action of he Society, and offering to the Library any of his works that are ot already in it.

Adjourned to Saturday, December 21.

BUSINESS MEETING.

SATURDAY, December 21, 1895.

The last meeting of the Society adjourned to today, and the members present were called to order by the President, but no quorum was present and the

Meeting was dissolved.

REPORT

OF THE

COMMITTEE ON PLANTS,

FOR THE YEAR 1895.

By AZELL C. BOWDITCH, CHAIRMAN.

Another year has passed over our heads, but we can hardly congratulate ourselves upon any very marked improvement in our exhibitions, with the exception of Orchids and Chrysanthemums, both of which were very fine and showed much improvement over former years. The absence of some of our larger growers of greenhouse plants was quite marked, and that very interesting class of trees, the Conifers, which are not only ornamental but instructive, was sadly missed the past season. But every Saturday, from early in the year to its close, has brought enough to please the eye and foster the ever-growing interest of both the amateurs and the public. The love of plants is ever on the increase and it will be the aim of your Committee, in the future as in the past, to encourage it by awarding the most liberal prizes offered by the Society, in as judicious and impartial a manner as possible.

The first exhibit for prize was on February 12, for Chinese Primroses, for which there were two competitors, John L. Gardner and Mrs. Benjamin P. Cheney.

Nathaniel T. Kidder showed a fine plant of *Acacia heterophylla*.

January 26, from the Botanic Garden of Harvard University came a fine plant of *Angræcum sesquipedale*, with seven spikes, having sixteen blooms.

ruary 21. The Society offered $100 in prizes for Palms and Decorative Plants at the meeting of the American Carnation y, which was competed for by Nathaniel T. Kidder and L. Gardner. John M. Anderson also made a very fine y of Cyclamens. George M. Nicholson showed some fine arias grown in six-inch pots.

rch 11. William H. Spooner showed the Crimson Rambler Too much cannot be said of this introduction, as it fills a long vacant in the gardens. The Bussey Institution ited some fine Anemones, and James Comley a plant of *odendron Livingstonii*.

SPRING EXHIBITION.

March 26, 27, 28, and 29.

e display of Orchids, Azaleas, Cyclamens, Tulips, Hyacinths, Narcissuses, with other Spring Flowering Bulbs, was remarkane. Dr. C. G. Weld and James Comley made fine displays dian Azaleas.

s. Frederick L. Ames made a magnificent display of Orchids, g which were *Cattleya Trianæ*, *C. Mossiæ*, and *C. lelli*, *Odontoglossum grande*, *O. aspersum*, *O. cordatum*, *ipedium Measuresianum*, *C. vexillarium*, and many others, about fifty plants.

e Bussey Institution made a nice showing of India Azaleas. ard Butler and Dr. C. G. Weld exhibited some fine plants. Butler also had three fine Orchids.

e Cyclamens were the finest ever exhibited; the plants from Benjamin P. Cheney were two feet in diameter and covered hundreds of blooms; other exhibitors were George M. rson, Dr. C. G. Weld and Nathaniel T. Kidder.

ierarias were exhibited by George M. Anderson, John L. ner, Mrs. Benjamin P. Cheney, and James Carthley.

e *Ouvirandra fenestralis* or Madagascar Lace Plant was ited by Elisha S. Converse; this most beautiful and curious ic plant attracted much attention.

e rest of the exhibition was made up of some very fine ays of Tulips, Hyacinths, Narcissuses, Lilies of the Valley, ias, Tritonias, etc., the whole forming one of the finest dis- of Spring Flowering Plants and Bulbs ever held in the hall.

MAY EXHIBITION.

May 4.

In the class of Pelargoniums Nathaniel T. Kidder had no competitor.

In the Calceolarias there was quite a rivalry, the first prize going to Dr. C. G. Weld for six nicely grown plants, remarkable for the brilliant green and closeness of their foliage. Dr. Weld also exhibited fifteen plants of Streptocarpus.

Nathaniel T. Kidder showed *Cymbidium Lowianum*.

May 24, Walter H. Cowing exhibited a new seedling Canna; it was of a bright clear yellow with lips spotted with carmine, for which he was awarded a First Class Certificate of Merit.

June 6, Mrs. Frederick L. Ames and John L. Gardner made fine displays of Orchids.

The exhibit of Cattleyas from John L. Gardner, was particularly good; indeed your Committee thought it the best ever made in the hall.

ROSE AND STRAWBERRY EXHIBITION.

June 20 and 21.

There was but one exhibit of Stove and Greenhouse plants, by Dr. C. G. Weld. John L. Gardner sent a fine plant of Rhynchospermum, exhibited as a specimen plant. James Comley showed a large plant of Rhododendron. Dr. C. G. Weld and Elisha S. Converse exhibited some good plants of Tuberous Begonias.

July 20, Oakes Ames, exhibited *Cypripedium bellatulum* and *C. Chamberlainianum*.

July 27, Mrs. Frederick L. Ames exhibited *Cypripedium Annie Measures*, a cross between *C. Dayanum* and *C. bellatulum*, for which she was awarded a First Class Certificate of Merit.

E. V. R. Thayer exhibited six plants of *Saintpaulia Ionantha*, which belongs to the Gesneria family. Seed sown in February flowers in July, and it may become a very desirable house plant. Awarded a First Class Certificate of Merit.

August 1, William Wallace Lunt sent *Cattleya Rex*. This is one of the most beautiful and highly colored of the Cattleyas. Awarded a First Class Certificate of Merit.

t 10, The Botanic Garden of Harvard University
l a plant of *Agave Kerchovei*, with flower stem nineteen
n — quite a curiosity. Nicholson's "Dictionary of Gar-
says that the flower is unknown. Awarded a gratuity.

AL EXHIBITION OF PLANTS AND FLOWERS.

September 4 and 5.

was no exhibit of Hardy Coniferous Trees. Your Com-
ave thought it advisable to increase the prizes as they
small to induce growers to handle them. It is hoped the
season, with the larger prizes, to have a creditable show.
hibition was again notable for the absence of Greenhouse
such as Palms, Aralias, Cycads, Ferns, etc., in groups.
six plants and single specimens there were the usual
tors.

Frederick L. Ames exhibited a beautiful plant of *Sophro-*
Veitchii, for which a Silver Medal was awarded; also a
Cypripedium Miss Ames, a new hybrid, which received
Class Certificate of Merit.

er 19, Rea Brothers exhibited a plant of *Scabiosa Cau-*
ar. *alba*, a new perennial said to be hardy; if it proves so
e quite an acquisition. It received the award of Honor-
ntion.

CHRYSANTHEMUM EXHIBITION.

November 5, 6, 7, and 8.

mmenting on this exhibition your Committee would say
ile the plants were grand and were the best ever seen in
lls, and perhaps as good as any seen on the other side of
an, they must deprecate the use of superfluous stakes and
to further their disuse your Committee have offered three
for plants grown to a single stem, with bushy tops, and
the aid of stakes, hoping by this means to bring into the
a class of plants more suitable for table and window
ion. The varieties in the collection from Nathaniel T.

Kidder (William J. Martin, gardener), which took the first prize for twelve plants of any or all classes, were:

Clinton Chalfant,	Joseph H. White,
Golden Hair,	Louis Boehmer,
H. L. Sunderbruch,	Portia,
Iora,	Superbiflora,
Ivory,	Vernal Fall,
John Shrimpton,	W. H. Lincoln.

Walter Hunnewell (T. D. Hatfield, gardener), exhibited a group of twelve plants that were a great credit to him. The Committee were put to their best endeavors to award this prize, the competition was so close.

Mr. Hunnewell's Collection comprised

Clinton Chalfant,	Mirabeau,
Columbine,	Octavia,
George W. Childs,	Portia,
Joseph H. White,	Primula,
Louis Boehmer,	Theo,
Louis Menand,	W. H. Lincoln.

Mr. Kidder had for his Specimen Japanese a most beautiful plant of the pink Iora, which for good points probably never had its equal in this country. It was fully six feet high and as many in diameter.

The names of other exhibitors may be found in the award of prizes in the different classes.

The Society's appropriation was . .		$2,100 00
Prizes awarded	$1,643 00	
Gratuities awarded	371 00	
Two silver medals awarded . . .	10 00	
	$2,024 00	
Balance unexpended,	76 00	
		2,100 00

A. C. Bowditch,
James Comley,
James Wheeler,
William Robinson,
David Allan,
} *Committee.*

ES AND GRATUITIES AWARDED FOR PLANTS. 1895.

January 12.

E Primroses.— Six plants in six-inch pots, John L. Gardner	$5 00
cond, Mrs. Benjamin P. Cheney	4 00
ird, John L. Gardner	3 00
ALIAS.— Three six-inch pots, the second prize to John L. Gardner	3 00
atuities:—	
el T. Kidder, *Acacia heterophylla*	3 00
et L. Waite, *Ornithogalum rigidulum*	1 00

TING OF THE AMERICAN CARNATION SOCIETY.

February 21 and 22.

AND Other Decorative Plants.— Best display, Nathaniel T. Kidder	50 00
cond, John L. Gardner	30 00
uities:—	
M. Anderson, Display of Cyclamens	15 00
iel T. Kidder, " " "	5 00
M. Nicholson, " " Cinerarias	6 00

March 11.

atuities:—	
Institution, Display of Anemones	3 00
Comley, *Rhododendron Livingstonii*	3 00

SPRING EXHIBITION.

March 26, 27, 28, and 29.

Theodore Lyman Fund.

Azaleas.— Six distinct named varieties, in pots, Dr. C. G. Weld	30 00
cond, James Comley	20 00
s.— Display, with Foliage Plants, arranged for effect in a pace eight feet by five feet, Mrs. Frederick L. Ames	30 00
cond, John L. Gardner	25 00

Society's Prizes.

INDIAN AZALEAS.— Four distinct named varieties, in not exceeding ten-inch pots, Bussey Institution	12 00
Second, Bussey Institution	10 00
Two distinct named varieties, Mrs. Henry F. Durant	6 00
Second, Dr. C. G. Weld	4 00
Specimen plant, named, Mrs. Henry F. Durant	8 00
Second, Bussey Institution	6 00
Single plant of any named variety, in not exceeding an eight-inch pot, Elisha S. Converse	5 00
Second, Dr. C. G. Weld	4 00
ORCHIDS.—Three plants in bloom, Mrs. Henry F. Durant	10 00
Single plant in bloom, Mrs. Henry F. Durant	5 00
Second, Nathaniel T. Kidder	4 00
Third, John L. Gardner	3 00
STOVE OR GREENHOUSE PLANTS.— Specimen in bloom, other than Azalea or Orchid, named, John L. Gardner	8 00
Second, Dr. C. G. Weld	6 00
HARD-WOODED GREENHOUSE PLANTS.— Four, in bloom, Dr. C. G. Weld	8 00
Second, Dr. C. G. Weld	6 00
HARDY FLOWERING DECIDUOUS SHRUBS, OTHER THAN AZALEAS, FORCED.— Four, of four distinct species, named, Bussey Institution	8 00
Second, Bussey Institution	6 00
HARDY AZALEAS.— Six plants, Bussey Institution	10 00
Second, Bussey Institution	8 00
HARDY FLOWERING EVERGREEN SHRUBS, FORCED.— Four, of four distinct species, Bussey Institution	8 00
CYCLAMENS.— Ten plants in bloom, Mrs. Benjamin P. Cheney	15 00
Second, George M. Anderson	12 00
Third, Mrs. Benjamin P. Cheney	10 00
Fourth, Dr. C. G. Weld	8 00
Ten plants in bloom, in not over seven-inch pots, Dr. C. G. Weld	8 00
Second, Mrs. Benjamin P. Cheney	6 00
Third, George M. Anderson	4 00
Single plant in bloom, Nathaniel T. Kidder	5 00
Second, Mrs. Benjamin P. Cheney	4 00
Third, Mrs. Benjamin P. Cheney	3 00
HARDY PRIMROSES.— Ten plants of distinct varieties, in bloom, John L. Gardner	5 00
POLYANTHUSES.— Ten plants, Fancy and Gold Laced, Bussey Institution	5 00
AURICULAS.— Six, in pots, Dr. C. G. Weld	3 00
Second, Dr. C. G. Weld	2 00

ARIAS.— Six varieties in bloom, George M. Anderson	8 00
cond, John L. Gardner	6 00
ird, Mrs. Benjamin P. Cheney	5 00
e varieties in bloom, James Carthley	5 00
cond, George M. Anderson	4 00
le plant in bloom, James Carthley	3 00
cond, John L. Gardner	2 00
ANDRA FENESTRALIS.— Elisha S. Converse	12 00

Spring Flowering Bulbs.

NTHS.— Twelve distinct named varieties, in pots, one in each pot, in bloom, Dr. C. G. Weld	10 00
cond, Bussey Institution	8 00
distinct named varieties, in pots, one in each pot, in bloom, Dr. C. G. Weld	6 00
cond, Elisha S. Converse	5 00
ird, Bussey Institution	4 00
e distinct named varieties, in pots, one in each pot, in bloom, Dr. C. G. Weld	4 00
cond, Elisha S. Converse	3 00
ird, Bussey Institution	2 00
le named bulb, in pot, in bloom, Elisha S. Converse	2 00
cond, Dr. C. G. Weld	1 00
e pans, not to exceed twelve inches, ten bulbs of one variety in each pan, Bussey Institution	10 00
cond, Dr. C. G. Weld	8 00
ird, Dr. C. G. Weld	6 00
pans, not to exceed twelve inches, with ten bulbs of one variety in each pan, Dr. C. G. Weld	8 00
cond, Bussey Institution	6 00
ird, Bussey Institution	5 00
le pan, not to exceed twelve inches, with ten bulbs of one variety, Dr. C. G. Weld	5 00
cond, Elisha S. Converse	4 00
ird, Bussey Institution	3 00
s.— Six eight-inch pans, nine bulbs of one variety in each, in bloom, Dr. C. G. Weld	5 00
cond, William S. Ewell & Son	4 00
ird, Bussey Institution	3 00
e eight-inch pans, nine bulbs of one variety in each, in bloom, Elisha S. Converse	4 00
cond, William S. Ewell & Son	3 00
ird, Bussey Institution	2 00
e ten-inch pans, twelve bulbs of one variety in each pan, Dr. C. G. Weld	6 00
cond, Bussey Institution	5 00
ird, William S. Ewell & Son	4 00
ourth, Bussey Institution	3 00

POLYANTHUS NARCISSUS.—Four seven-inch pots, three bulbs in each, distinct varieties, in bloom, Dr. C. G. Weld 6 00
Second, Dr. C. G. Weld 4 00
Third, Bussey Institution 3 00
JONQUILS.— Six six-inch pots, the number of bulbs in each to be at discretion of the grower, in bloom, Bussey Institution . . 5 00
Second, William S. Ewell & Son 3 00
Third, Dr. C. G. Weld 2 00
LILIUM LONGIFLORUM.— Three pots, not exceeding ten inches, Bussey Institution 8 00
LILIUM HARRISII.— Three pots, not exceeding ten inches, Bussey Institution 8 00
LILY OF THE VALLEY.— Six six-inch pots, in bloom, Bussey Institution 5 00
Second, William S. Ewell & Son 4 00
ANEMONES.— Three pots or pans, Bussey Institution . . . 5 00
Second, Bussey Institution 4 00
FREESIAS.— Six pots or pans, Dr. C. G. Weld 5 00
Second, John L. Gardner 4 00
Third, Bussey Institution 3 00
IXIAS.— Six pots in varieties, Dr. C. G. Weld 4 00
TRITONIA CROCATA.— Six pots, Dr. C. G. Weld 4 00
ROMAN HYACINTHS.—Six eight-inch pans, ten bulbs in each pan, Dr. C. G. Weld 5 00
Second, William S. Ewell & Son 4 00
Third, Bussey Institution 3 00

Prize for Florists Only.

GENERAL DISPLAY OF SPRING BULBS.— All classes, William S. Ewell & Son 12 00

Gratuities:—

James Comley, Display of thirty pots of Roses, etc. . . . 20 00
Botanic Garden of Harvard University, *Phaius grandifolius* . . 5 00
David Nevins, *Primula obconica* 2 00
David Allan, Display of Orchids 3 00
David Nevins, Roses in pots 2 00
Charles J. Power, Lily of the Valley 5 00
Nathaniel T. Kidder, Display 8 00
Bussey Institution, " 5 00
Dr. C. G. Weld, " 5 00

MARCH 23.

Gratuity:—

Edward Butler, *Dendrobium nobile* 8 00

APRIL 13.

Gratuities:—

John L. Gardner, Display of Orchids 5 00
H. Hollis Hunnewell, Plant of Crimson Rambler Rose . . . 2 00

MAY EXHIBITION

May 4.

NIUMS.— Six named Show or Fancy varieties, in not less	
n eight-inch pots, in bloom, Nathaniel T. Kidder . .	8 00
ned Zonale varieties, in pots, in bloom, Nathaniel T. Kidder	6 00
ZALEAS.— Six plants in pots, named, C. Minot Weld .	15 00
nd, John L. Gardner	12 00
specimen, Nathaniel T. Kidder	5 00
nd, John L. Gardner	4 00
RIAS.—Six varieties, in pots, Dr. C. G. Weld . . .	8 00
nd, Elisha S. Converse	6 00
l, John L. Gardner	4 00
plant, Dr. C. G. Weld	3 00
nd, Mrs. Benjamin P. Cheney	2 00
l, Mrs. Benjamin P. Cheney	1 00
uities :—	
Weld, *Lomaria gibba* and fifteen plants of Streptocarpus,	
. . . . .	8 00
Hunnewell, Plants of *Calceolaria rugosa*, (a shrubby	
cies)	2 00
T. Kidder, *Cymbidium Lowianum*	2 00
Gardner, Collection of Orchids, etc.	15 00

May 18.

uities :—	
Gardner, *Wistaria Sinensis*	4 00
Gardner, Orchids	10 00

May 24.

uities :—	
Gardner, Display of Orchids	8 00

June 6.

uities :—	
Gardner, Display of Cattleyas (forty plants) . . .	25 00
lerick L. Ames, Display of Orchids	20 00

June 15.

uities :—	
mley, Display of Cattleyas	2 00

ROSE AND STRAWBERRY SHOW.

June 20 and 21.

D GREENHOUSE FLOWERING PLANTS.—Two distinct named	
ieties, in bloom, no Orchid admissible, Dr. C. G. Weld .	15 00

SPECIMEN PLANT IN BLOOM.— Named, other than Orchid, John L. Gardner, *Rhynchospermum jasminoides* 7 00
Second, James Comley, *Rhododendron Livingstonii* . . 5 00
SPECIMEN FOLIAGE PLANT.— New and rare, other than Orchid, the Second prize to Dr. C. G. Weld 5 00
HARD-WOODED GREENHOUSE PLANTS.— Three, of three distinct named varieties, in bloom, John L. Gardner 8 00
Second, John L. Gardner 6 00
ORCHIDS.— Six plants, of six named varieties, in bloom, John L. Gardner 25 00
Three plants, of three named varieties, in bloom, the Second prize to John L. Gardner 10 00
Single specimen, named, Dr. C. G. Weld 8 00
Second, John L. Gardner 6 00
TUBEROUS BEGONIAS.— Six pots, of six varieties, Dr. C. G. Weld 6 00
Second, Elisha S. Converse 4 00

Gratuities :—
John L. Gardner, Display of Orchids 15 00
David Allan, *Allamanda Williamsonii* 1 00

JUNE 29.

Gratuity :—
Joseph Tailby, *Brassia verrucosa* 2 00

JULY 20.

HYDRANGEAS.— Pair, in tubs or pots, Samuel J. Trepess . . 8 00
Single plant, in tub or pot, Samuel J. Trepess 5 00
GLOXINIAS.— Six pots, in bloom, the Second prize to John P. Spaulding 4 00

Gratuities :—
Oakes Ames, *Cypripedium bellatulum* and *C. Chamberlainianum* 3 00

JULY 27.

Gratuity :—
Mrs. D. E. Butterfield, Gloxinia Plant 1 00

AUGUST 3.

Gratuity :—
Oakes Ames, *Ophiopogon spicatus aureo variegatus* . . . 1 00

AUGUST 10.

Gratuity :—
Bussey Institution, Achimenes 1 00

AUGUST 24.

Gratuities :—
Elisha S. Converse, *Gymnogramme Peruviana* 2 00
Botanic Garden of Harvard University, *Agave Kerchovei* . . 5 00

UAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 4 AND 5.

Special Prizes Offered by the Society.

- Pair, in pots or tubs not more than twenty-four inches in ameter, Dr. C. G. Weld	12 00
ond, Nathaniel T. Kidder	8 00
n pots not more than fourteen inches in diameter, Elisha S. onverse	8 00
ond, Nathaniel T. Kidder	6 00

Regular Prizes.

OUSE PLANTS.— Six Greenhouse and Stove Plants, of different named varieties, two Crotons admissible, Nathaniel T. idder	30 00
ond, John L. Gardner	25 00
rd, Dr. C. G. Weld	20 00
plant for table decoration, dressed at the base with living ants only, only one entry admissible, Elisha S. Converse	6 00
ond, John McKenzie	4 00
rd, Moses T. Stevens	3 00
N FLOWERING PLANT.— Single named variety, Nathaniel . Kidder	8 00
s.— Six, in not over ten-inch pots, Nathaniel T. Kidder	6 00
NTAL LEAVED PLANTS.— Six named varieties, not offered in e collection of greenhouse plants, Crotons and Dracænas ot admissible, Dr. C. G. Weld	20 00
ond, James Comley	15 00
rd, Nathaniel T. Kidder	12 00
specimen, variegated, named, not offered in any collection, athaniel T. Kidder	6 00
ond, Dr. C. G. Weld	5 00
rd, John L. Gardner	4 00
MS.— Six named varieties, Dr. C. G. Weld	6 00
ond, Nathaniel T. Kidder	4 00
- Six named varieties, no Adiantums admissible, Nathaniel . Kidder	10 00
ond, Dr. C. G. Weld	8 00
MS.—Five distinct named species, other than Farleyense, r. C. G. Weld	8 00
ERN.— Single specimen, named, not less than six feet in eight, Elisha S. Converse	10 00
DS.— Four named varieties, Nathaniel T. Kidder	5 00
ond, Dr. C. G. Weld	4 00
AS.— Six named varieties, Dr. C. G. Weld	8 00
ond, Nathaniel T. Kidder	6 00

CROTONS.— Six named varieties, in not less than twelve-inch pots, Dr. C. G. Weld 6 00
Second, Dr. C. G. Weld 5 00
Third, John L. Gardner 4 00
CYCAD.— Single plant, named, Mrs. Anna D. Wood . . . 10 00
Second, Elisha S. Converse 8 00
ORCHIDS.— Six plants, named varieties, in bloom, John L. Gardner 15 00
TUBEROUS BEGONIAS.— Six pots of six varieties, Dr. C. G. Weld . 6 00

Gratuities:—

J. W. Howard, Seedling Coleus 2 00
Botanic Garden of Harvard University, Collection 30 00
Elisha S. Converse, Collection 10 00
David Allan, Collection 4 00

SEPTEMBER 21.

Gratuity:—

Botanic Garden of Harvard University, Twelve plants of *Nerine Sarniensis* 3 00

SEPTEMBER 28.

Gratuity:—

Jason S. Bailey, Display of Orchids 3 00

OCTOBER 2.

Gratuity:—

Nathaniel T. Kidder, Display of plants 25 00

CHRYSANTHEMUM EXHIBITION.

NOVEMBER 5, 6, 7, AND 8.

CHRYSANTHEMUMS.— Display of twelve named plants any or all classes, distinct varieties, Nathaniel T. Kidder . . . 60 00
Second, Walter Hunnewell 50 00
Fourth, H. Fisher Eldredge 30 00
Twelve plants of twelve different varieties grown to one stem and bloom, in not over six-inch pots, preference being given to plants not more than three feet in height, Dr. C. G. Weld . 12 00
Second, James L. Little 10 00
Third, Elisha S. Converse 8 00
Fourth, Jason S. Bailey 6 00
Red, six plants grown as above but all of one color and different varieties, Dr. C. G. Weld 6 00
Second, James L. Little 5 00
Third, Elisha S. Converse 4 00
White, Dr. C. G. Weld 6 00
Second, James L. Little 5 00
Third, Donald McRea 4 00
Pink, James L. Little 6 00
Second, Dr. C. G. Weld 5 00
Third, Elisha S. Converse 4 00

Donald McRea	6 00
d, James L. Little	5 00
Dr. C. G. Weld	4 00
er color, Dr. C. G. Weld	6 00
d, James L. Little	5 00
f plants, arranged for effect, limited to one hundred and square feet, preference being given to collections with ns or other foliage added, Mrs. Benjamin P. Cheney	45 00
d, J. W. Howard	40 00
A. W. Blake	35 00
n, Bussey Institution	30 00
H. F. Eldredge	25 00
nese, distinct named varieties, Mrs. Benjamin P. Cheney	20 00
d, Mrs. Benjamin P. Cheney	15 00
Nathaniel T. Kidder	10 00
n Japanese, named variety, Nathaniel T. Kidder	6 00
d, Mrs. Benjamin P. Cheney	5 00
Walter Hunnewell	4 00
n Pompon, named variety, Arthur Hunnewell	4 00
ities:—	
. Elliott, Display	25 00
mmin P. Cheney, Display of *Adiantum Farleyense*	25 00
Weld, Ericas	4 00
ailey, Display,	4 00

NOVEMBER 16.

ity: —

ley, Pots Seedling Chrysanthemum Francis B. Hayes	3 00

SOCIETY'S SILVER MEDAL.

. Botanic Garden of Harvard University, *Angræcum sesquipedale.*

hibition, September 4 and 5. Mrs. Frederick L. Ames, *Sophro-Lælia Veitchii.*

FIRST CLASS CERTIFICATES OF MERIT.

William H. Spooner, Crimson Rambler Rose.

Thomas H. Westwood, New Seedling Canna.

Mrs. Frederick L. Ames, *Cypripedium Annie Measures*, cross between *Cypripedium bellatulum* and *C. Dayanum.*

E. V. R. Thayer, *Saintpaulia Ionantha.*

William W. Lunt, Cattleya Rex.

hibition, September 4 and 5. Mrs. Frederick L. Ames, *Cypriped ium Miss Ames.* (New.)

HONORABLE MENTION.

. Rea Brothers, *Scabiosa Caucasica*, variety *alba.* Hardy perennial.

REPORT

OF THE

COMMITTEE ON FLOWERS,

FOR THE YEAR 1895.

By ARTHUR H. FEWKES, CHAIRMAN.

The Committee on Flowers have but little to report for the past year that is of exceptional interest, as the displays have differed but little from those of previous years, although as a whole our exhibitions have averaged better than ever before, particularly in the number of exhibits and in the fewer inferior flowers shown.

The exhibitions during the early months of the year, though not numerous, were excellent and helped very much to enliven the hall at our weekly meetings. Francis Brown Hayes was the principal exhibitor.

The displays of Wild Flowers have been as popular as in previous seasons, and have assumed an importance second to that of no other department in their educational value, and, almost unconsciously it seems, the Society has established a School of Botany, which is quite unique in its way. Nowhere else can the student of that science find such an opportunity for the study of our Native Flora. It has gone beyond a simple matter of local interest, for the reputation of these displays has spread far and wide and there are many who visit our weekly shows purposely to study these exhibits.

When we consider the growing importance of this branch, we can but feel the necessity for competent botanists to act as

A florist, a gardener, or a horticulturist is not necessarily
t, and it seems an injustice to both the exhibitor and the
hat the Flower Committee should be compelled to judge
plays.

oyal Horticultural Society of England has its Botanical
e and why can not we also have one? They take charge
splays of purely botanical interest and are a valuable
to the Standing Committees of the Society. Such a
e might be entirely independent or act as a division of
ar Flower Committee.

splays of Carnations on February 21 and 22, when the
n Carnation Society held their Annual Meeting, should be
d, although the exhibition was not one of our own, but
to that Society. It was a grand display of this popular
naking one wish that we might have a repetition of it
.

rch 16, a First Class Certificate of Merit was awarded to
er McKay, gardener to David Nevins, for superior culti-
Hybrid Roses under glass, he having made exhibits of
hich we have never seen equalled. On the same date
ss Certificates of Merit were awarded to Sewall Fisher
ingham, for a beautiful white seedling Carnation, named
and Fred Dorner of Lafayette, Ind., for his white
Carnation, Storm King. These two varieties are very
g and are superior to other white varieties in cultivation.

SPRING EXHIBITION.

March 26, 27, 28, and 29.

is exhibition the cut flowers were well represented and
narked improvement over last year. We were pleased to
revival of interest in forced Hybrid Roses, which were
ntirely absent from our last Spring Show. There was
e interest shown in the Tea Roses, of which there were
t examples of several varieties. Carnations are always
resented at this show and are destined to be one of the
features of it if they receive the encouragement due so
l a flower.

The display of Violets was quite remarkable, particularly the flowers shown by David Nevins (Alexander McKay gardener), which were the largest we have ever had the pleasure of examining.

The Antirrhinum is making a place for itself as a winter flower and attracted much attention.

James Comley made a very beautiful display with forced flowers of a form of *Clematis montana* which he raised from seed collected in Japan. If this form proves hardy in this latitude it will be a grand addition to our hardy vines.

MAY EXHIBITION.

May 4.

The displays of flowers at this exhibition were not extensive but were mostly good. Tulips were very poorly shown and there was but one exhibitor of Herbaceous Plants. William Nicholson showed remarkably fine Carnation flowers and as he has made numerous displays of equal quality, we awarded him a First Class Certificate of Merit, for superior cultivation of the Carnation.

From the May Show to the Rhododendron Show the exhibitions were of the usual excellence.

On June 1, First Class Certificates of Merit were awarded to James Comley for a Seedling Rhododendron and Thomas C. Thurlow for *Symplocos Japonica*.

RHODODENDRON SHOW.

June 6 and 7.

This, as usual, was one of our most beautiful exhibitions. The displays of Hardy Rhododendrons were particularly interesting, for they were specimens of the varieties which, with proper care, may be planted out with reasonable certainty that they will live from year to year.

Following is a list of varieties which stood the unusually severe winter of 1894–5 on the grounds of Mr. H. H. Hunnewell; also

twelve hardy varieties which survived the winter on the of Francis B. Hayes at Lexington.

f varieties of Hardy Rhododendrons, which stood the of 1894–5, on the grounds of H. H. Hunnewell at y.

ebell,	Lady Rolle,
rles Thorold,	Mrs. Arthur Hunnewell,
ntess of Normanton,	Mrs. Heywood,
hess of Connaught,	Mrs. H. Ingersoll,
hess of Sutherland,	Mrs. R. S. Holford,
ward S. Rand,	Mrs. Shuttleworth,
D. Godman,	Michael Waterer,
L. Ames,	Minnie,
nes Mackintosh,	Neilsoni,
nes Nasmyth,	Princess Mary of Cambridge,
Marshall Brooks,	Ralph Sanders,
n Waterer,	Silvio,
e Waterer,	St. Simon,
ly Grey Egerton,	The Queen.

of twelve Hardy Rhododendrons, which stood the winter –5, on the grounds of Francis B. Hayes at Lexington,

oum elegans,	H. W. Sargent,
oum triumphans,	Lady Armstrong,
rorubrum,	Maculatum,
ractacus,	Oculatum nigrum,
licatissimum,	Roseum elegans,
erestianum,	Roseum grandiflorum.

aceous Pæonies were almost entirely absent, as this ex- is fully a week too early for them.

seasonable flowers were shown in great quantities and of ality, conspicuous among them being the Orchids and Rhododendrons from Mrs. Frederick L. Ames, the eous Plants from J. W. Manning and the Botanic Garden rvard University, and the displays of German Irises, l Poppies, and Pelargoniums.

Mrs. Frederick L. Ames was awarded a First Class Certificate of Merit for *Aristolochia Gigas Sturtevantii*, a gigantic representative of the Dutchman's Pipe family.

ROSE SHOW.

JUNE 20 AND 21.

With the present year the manner of showing the roses was changed throughout the entire exhibition. The old wooden boxes were discarded and all flowers were shown in vases, to the manifest improvement in the appearance of the hall.

The present season was a very trying one for the rose; the unseasonably warm weather in April and the dry weather in May did them great harm and materially injured the exhibition as a whole. It was claimed by some that the deficiencies in the exhibits were occasioned by the change in the Schedule whereby all duplicates were prohibited in the different classes when competed for by one individual. This may have made some difference in the general display but when it is considered that there was but one less award made the present year to competitors in the various classes than there was last year it seems unjust to attribute all the injury to that cause.

As has been the rule for several years past the best roses came from the South Shore, principally from Hon. Joseph S. Fay of Wood's Holl. J. Eaton, Jr., of New Bedford, also contributed many fine blooms. In the class for the best single bloom of any variety, Hon. J. S. Fay took all the prizes with the following varieties in the order named, viz: Earl of Dufferin, Princess Rodocanachi, and Margaret Dickson. The first prize for a single bloom of any variety introduced since 1892, was awarded to J. Eaton, Jr., for Marchioness of Londonderry and the second to W. W. Astor, of Newport, R. I., for the same variety.

There were many interesting miscellaneous collections, the Herbaceous Plants being most prominent.

Charles J. Dawson brought from the Bussey Institution, fine flowers of the rare *Ostrowskya magnifica*, a very difficult plant to grow.

James Comley was awarded a First Class Certificate of Merit for a seedling *Rhododendron maximum*, with white flowers blotched with yellow.

everal occasions Mr. M. H. Walsh has exhibited his Hybrid Rose, the Michael H. Walsh, and on July 1, was awarded a First Class Certificate of Merit for it. appeared to us to have so much promise that we deemed ient to see the plants growing and flowering in the open and on invitation of Mr. Walsh we visited the grounds of oseph S. Fay, his employer, on July 9, of this year, to further examination of the variety. The rose exceeded t sanguine expectations, and of the great number of older in Mr. Fay's collection, the cream of the European pro-, there was not one to surpass this in beauty or vigor. he more remarkable when we take into consideration that undreds of varieties of Hybrid Roses there are but two or any merit that are of American origin. With this fact it was the unanimous opinion of the Committee that the should bestow upon it the highest honor within its power. efore awarded Mr. Walsh the Society's Gold Medal.

xhibition of the week after the regular Rose Show has considerable importance as a rose exhibition, and the own are often superior to many at the regular show. son June 29 was no exception, and we had fine displays id Roses, *Iris Kœmpferi*, English Irises, Delphiniums, *candidum*, *Campanula Medium*, Herbaceous Plants, Plants, and a great variety of other seasonable flowers.

13 was Hollyhock day, but this has ceased to be the l exhibition it was a few years ago, owing to the ravages ollyhock fungus, which has nearly put a stop to hollyhock in this region.

is date William Robinson was awarded a Silver Medal for ng Sobralia named *Amesiæ*, a cross between *xantholeuca liamsii*. This is a very beautiful orchid and a credit to its or. Mrs. Frederick L. Ames was awarded a First Class te of Merit for a number of beautiful varieties of Javan endrons.

27 was Sweet Pea day and the displays were numerous utiful. Particularly valuable were the named varieties ederick A. Blake, A. A. Hixon, and John P. Spaulding.

st 3 was prize day for Hardy Nymphæas. The prizes npeted for by Hon. John Simpkins and Oakes Ames and

won in the order named. The collection of Mr. Simpkins was of extraordinary merit and manifested great skill in cultivation. It included several new varieties, three of which were awarded First Class Certificates of Merit; *N. Laydekeri lilacina*, an improved *Laydekeri rosea; N. Marliacea flammea*, a magnificent cup-shaped flower of about four rows of petals, which are very broad and rounded, deep lilac-carmine in color, with large yellow disk in the centre; and *N. Marliacea Robinsonia*, a very large carmine-rose colored flower with pointed petals. Mr. Simpkins was also awarded the Appleton Silver Medal for the great excellence of his exhibit.

Mrs. Frederick L. Ames was awarded a First Class Certificate of Merit for new Montbretias.

ANNUAL EXHIBITION.

September 4 and 5.

The cut flowers at this show, while making a very important part of the exhibition, were not, as a whole, so numerous as they have sometimes been. Dahlias were shown in great quantities and of fine quality. The Aquatics are always interesting and on this occasion they attracted much attention. The *Victoria regia* was much missed but the displays of Nymphæas and Nelumbiums were quite equal to any previous show of them.

First Class Certificates of Merit were awarded to J. W. Howard for a new Chrysanthemum-flowered Double Sunflower, a most remarkable form of this old plant; and to P. Bisset for a Seedling Nelumbium, deep rosy-carmine in color, grown from seed sent from Corea.

Robert Christie was awarded Honorable Mention for a collection of Seedling Cannas, and Warren W. Rawson & Co. were awarded the Society's Silver Medal for a collection of Dahlias which were well arranged, of the best quality, and exceeded in extent any previous exhibition of this flower known to us.

September 14, Oakes Ames was awarded Honorable Mention for a white Nelumbium, *N. album grandiflorum*.

CHRYSANTHEMUM SHOW.

NOVEMBER 5, 6, 7, AND 8.

ears ago it seemed as though the height of perfection had ched in the cultivation of Chrysanthemums, but there has eady improvement and the show of flowers this year all our previous exhibitions, particularly in the size and blooms. The flowers from John Simpkins and Edmund Co. were marvels in size and symmetry. It would be to attempt to select any special varieties from their for they were all so good.

were very few classes that were not competed for and w displays not in competition. As usual the greatest tion was in the classes for twenty-five flowers of twenty- ieties, there being no less than eight competitors and ee prizes to award.

al effort was made this year to bring the Anemone-flowered re into notice and exhibit the strange forms peculiar to s. The display by Hon. John Simpkins of these flowers remarkable one and illustrated their peculiarities in a manner.

ings were less numerous than for several years, the most g being the pink variety shown by E. G. Hill of Rich- nd., named Mrs. Perrine; the bronze-yellow variety from Gane, named West Newton, and the white variety from n, Jr., named J. H. Woodford. First Class Certificates t were awarded to T. D. Hatfield for a new seedling named , and to H. A. Gane for a new seedling Anemone-flowered, Marcia Jones. Complimentary notice was issued to Mr. Gane for four new seedling Chrysanthemums.

aniel T. Kidder, having obtained the greatest number of zes throughout the season for Herbaceous Plants, became to the Appleton Silver Medal, and J. W. Manning to the n Bronze Medal for the next greatest.

Committee have awarded during the year one Society's Medal, two Society's Silver Medals, two Appleton Silver one Appleton Bronze Medal, sixteen Certificates of Merit, norable Mentions and one Complimentary Notice.

The amount appropriated for the year 1895 was	$2,500 00
Additional appropriation	200 00
	2,700 00
We have awarded in prizes and gratuities, including medals	2,660 00
Leaving an unexpended balance of	$40 00

All of which is respectfully submitted.

For the Committee,

ARTHUR H. FEWKES,
Chairman.

ES AND GRATUITIES AWARDED FOR FLOWERS.

1895.

January 5.

atuities: —

Brown Hayes, Display of Flowers	4 00
Coburn, Chinese Primulas	1 00

January 12.

atuities: —

Brown Hayes, Camellias	4 00
Nevins, Two bunches Marie Louise Violets	2 00
Craig, Vase of *Freesia refracta alba*	2 00
Nicholson, Carnations	1 00
Coburn, Chinese Primulas	1 00
M. Gill, Display of Flowers	2 00

January 19.

atuities: —

Brown Hayes, Cut Flowers	4 00
M. Gill, " "	1 00

January 26.

atuities: —

Brown Hayes, Camellias	3 00
M. Anderson, Cyclamens	1 00

February 2.

s.— Display of named species and varieties, filling not less
an twelve bottles, Mrs. F. L. Ames 15 00
ond, Mrs. F. L. Ames 10 00
s.— Best collection of varieties, fifty blooms of each in a
unch, W. N. Craig 4 00
ond, Nathaniel T. Kidder 3 00
rd, Harry S. Rand 2 00
IONS.— Display of cut blooms, with foliage, not less than
ix varieties, in vases, William Nicholson 5 00
ond, W. N. Craig 4 00
IAS.— Display of named varieties, cut flowers, with foliage,
ot less than twelve blooms, of not less than six varieties,
Francis Brown Hayes 4 00
ond, John L. Gardner 3 00

atuities: —

Brown Hayes, Camellias	3 00
Institution, Forced Crab Apple blossoms	3 00

Norris F. Comley, Forced Lilacs	1 00
David Nevins, Three vases of Violets	2 00
C. E. Weld, Violets	1 00
W. N. Craig, Vase of *Eucharis Amazonica*	2 00
W. E. Coburn, Chinese Primulas	1 00
C. E. Richardson, Acacia and Azaleas	1 00
Mrs. E. M. Gill, Display of Flowers	3 00
Mrs. A. D. Wood, Cut Flowers	2 00
Mrs. P. D. Richards, Wild Flowers	1 00

FEBRUARY 9.

Gratuities : —

Bussey Institution, Display of Forced Shrubs and Flowers	3 00
Mrs. E. M. Gill, Cut Flowers	1 00

FEBRUARY 16.

Gratuities : —

Bussey Institution, Cherokee Roses	1 00
Mrs. E. M. Gill, Cut Flowers	1 00

FEBRUARY 22.

Gratuities : —

Mrs. A. D. Wood, *Antirrhinum majus*	3 00
Dailledouze Brothers, Flatbush, N. Y., Mignonette	2 00
William W. Edgar, Mignonette	2 00

MARCH 9.

Gratuities : —

David Nevins, Five vases of Hybrid Roses	5 00
James Comley, Camellias, Roses, etc.	4 00
Bussey Institution, Lilies and Rhododendrons	1 00
Harry S. Rand, Six vases of Violets	1 00
Mrs. E. M. Gill, Cut Flowers	1 00

MARCH 16.

Gratuities : —

James Comley, Cut Flowers	4 00
Mrs. A. D. Wood, " "	3 00

SPRING EXHIBITION.

MARCH 26, 27, 28, AND 29.

HYBRID PERPETUAL ROSES.— Twelve cut blooms of not less than six distinct named varieties, David Nevins	8 00
Second, James Comley	6 00
Six cut blooms, distinct named varieties, James Comley	6 00
Twelve cut blooms of Ulrich Brunner, David Nevins	10 00

Roses in Vases.—Twelve blooms of American Beauty, Hon. John P. Spaulding	8 00
ve blooms of Catherine Mermet, Thomas H. Meade	8 00
ond, William H. Elliott	6 00
rd, Charles V. Whitten	4 00
ve blooms of Meteor, Charles V. Whitten	8 00
ve blooms of Papa Gontier, William H. Elliott	8 00
ond, William H. Elliott	6 00
ve blooms of The Bride, William H. Elliott	8 00
ond, Charles V. Whitten	6 00
rd, Hon. John P. Spaulding	4 00
Tender Rose introduced since 1892, F. R. Pierson, Tarrytown, N. Y., for Bridesmaid	4 00
ond, Hon. John P. Spaulding, for Bridesmaid	3 00
s.—Forty-eight cut blooms, not less than twenty-four varieties, Hon. Joseph S. Fay	4 00
ond, Hon. Joseph S. Fay	3 00
rd, Hon. Joseph S. Fay	2 00
s.— Best bunch of fifty blooms of Czar, Harry S. Rand	2 00
ond, Nathaniel T. Kidder	1 00
bunch of fifty blooms of Lady Hume Campbell, Harry S. Rand	2 00
bunch of fifty blooms of Marie Louise, David Nevins	2 00
ond, Nathaniel T. Kidder	1 00
bunch of fifty blooms of any other variety, Nathaniel T. Kidder, for Swanley White	2 00
ond, Nathaniel T. Kidder, for Neapolitan	1 00
ions.—Display of cut blooms, with foliage, not less than six varieties, in vases, William Nicholson	5 00
ond, F. A. Blake	4 00
ve blooms of any named Crimson variety, William Nicholson, for Ferdinand Mangold	3 00
ond, Arthur H. Fewkes, for Anna Webb	2 00
ve blooms of any named Dark Pink variety, William Nicholson, for Nicholson	3 00
ond, F. A. Blake, for William Scott	2 00
ve blooms of any named Light Pink variety, Joseph H. White, for Daybreak	3 00
ond, William Nicholson, for Daybreak	2 00
ve blooms of any named Scarlet variety, William Nicholson, for Hector	3 00
ond, L. H. Foster, for The Stuart	2 00
ve blooms of any named White variety, David Nevins, for Mrs. Fisher	3 00
ond, F. A. Blake, for Lizzie McGowan	2 00
ias.—Display of named varieties, cut flowers with foliage, not less than twelve blooms, of not less than six varieties, John L. Gardner	4 00

Second, James Comley	3 00
Six cut blooms, of not less than four named varieties, with foliage, Joseph H. White	3 00
CENTRE PIECE.— The last day of the Exhibition, Mrs. E. M. Gill	10 00
Second, Mrs. A. D. Wood	8 00
BRIDE'S BOUQUET.— The Second prize to Mrs. E. M. Gill	4 00

Gratuities: —

James Comley, Display of Roses	10 00
David Nevins, Hybrid Perpetual Roses	5 00
F. R. Pierson, Vases of Tea Roses, Meteor and Kaiserin Augusta	2 00
Edward Butler, Thirteen vases of Orchids	3 00
David Allan, Orchids	1 00
C. W. Ward, Collection of Carnations	5 00
Arthur H. Fewkes, Three vases of *Antirrhinum majus*	3 00
William H. Elliott, *Asparagus plumosus nanus*	3 00
James Comley, Wistaria, Rhododendrons, and Clematis	3 00
F. R. Pierson, Tarrytown, N. Y., Display of Cannas	2 00
Harry S. Rand, Eight vases of Violets	2 00
Botanic Garden, Collection of Sarracenias	2 00
Mrs. A. D. Wood, Cut Flowers	4 00
Mrs. E. M. Gill, " " etc.	3 00

APRIL 6.

Gratuity: —

James Comley, Azaleas, Roses, etc.	4 00

APRIL 13.

Gratuity: —

James Comley, Thirty varieties of Roses	2 00

APRIL 20.

Gratuity: —

Mrs. E. M. Gill, Cut Flowers	1 00

APRIL 27.

Gratuities: —

William Nicholson, Carnations	1 00
James Comley, Vase of *Magnolia stellata* and Wistaria	1 00
Mrs. A. D. Wood, Cut Flowers	2 00
Mrs. E. M. Gill, " "	1 00

MAY EXHIBITION.

MAY 4.

TULIPS.— Twenty-four blooms, distinct named varieties, the Second prize to John L. Gardner	4 00

Narcissuses.— Collection of not less than ten named varie-	
s of blooms, in vases, John L. Gardner	6 00
nd, Bussey Institution	5 00
— Forty-eight cut blooms, not less than twenty-four varie-	
s, Hon. Joseph S. Fay	4 00
nd, Hon. Joseph S. Fay	3 00
d, Hon. Joseph S. Fay	2 00
ous Plants.— Thirty bottles, Nathaniel T. Kidder . .	8 00
Plants.— Collection not exceeding thirty bottles, Mrs. P.	
Richards	5 00
nd, Miss C. M. Endicott and Miss M. C. Hewett . .	4 00
d, Misses Eleanor and Mollie Doran	3 00
tuities : —	
Gardner, Tulips and Fritillarias	4 00
. Weld, Display of Narcissuses	4 00
nverse, Gloxinias	1 00
eph S. Fay, Pansies	3 00
. Weld, "	1 00
omley, Display	5 00
M. Gill, Cut Flowers	3 00

May 11.

tuities : —	
eph S. Fay, Pansies	4 00
omley, Display	4 00
M. Gill, "	2 00
D. Wood, "	2 00
D. Richards, Native Plants	2 00

May 18.

tuities : —	
omley, Display	3 00
Gardner, "	2 00
D. Wood, Cut Flowers	1 00
M. Gill, " "	1 00
M. Endicott and Miss M. C. Hewett, Native Plants . .	3 00
D. Richards, Native Plants	3 00
ry E. Loud, " "	2 00

May 25.

eonies.— Three double varieties, named, three of each,	
hn L. Gardner	3 00
tuities : —	
omley, Hardy Shrubs and Cut Flowers	5 00
ard & Son, Collection of Pelargoniums, Azaleas, etc. .	2 00

William Miller and Son, Hardy Pinks	1 00
John L. Gardner, Collection of Cut Flowers	2 00
Mrs. Mary E. Loud, Wild Flowers	3 00
Mrs. P. D. Richards, " "	2 00

JUNE 1.

Gratuities: —

H. H. Hunnewell, Collection of Rhododendrons	5 00
James Comley, Collection of Rhododendrons, Azaleas, Roses and Orchids	7 00
T. C. Thurlow, Collection of Flowering Shrubs	1 00
L. M. Chase, Snowballs, etc.	1 00
Mrs. E. M. Gill, Display	2 00
Mrs. Mary E. Loud, Native Ferns	1 00

RHODODENDRON SHOW.

JUNE 6 AND 7.

H. H. Hunnewell Fund.

RHODODENDRONS. — Twelve distinct varieties, of unquestioned hardiness, named, James Comley, a piece of plate valued at	20 00
Second, John L. Gardner, a piece of plate valued at	15 00
Six distinct varieties, of unquestioned hardiness, named, Samuel J. Trepess	10 00
Second, Mrs. B. P. Cheney	5 00
Six tender varieties, named, James Comley	5 00
Three tender varieties, named, the Second prize to John L. Gardner	3 00
HARDY AZALEAS. — From any or all classes, fifteen varieties, one vase of each, James Comley	8 00
Second, Thomas C. Thurlow	5 00
Twelve varieties, one vase of each, Thomas C. Thurlow	4 00
Cluster of trusses, one variety, Thomas C. Thurlow	2 00

Society's Prizes.

HERBACEOUS PÆONIES. — Twelve named varieties, the Third prize to John L. Gardner	6 00
GERMAN IRISES. — Six distinct varieties, one spike of each, Walter H. Cowing	3 00
Second, George Hollis	2 00
HARDY PYRETHRUMS. — Display, John L. Gardner	3 00
HARDY FLOWERING TREES AND SHRUBS. — Collection of thirty species and varieties, named, cut blooms, the Third prize to Alice Grinnell	5 00
HERBACEOUS PLANTS. — Thirty bottles, J. W. Manning	8 00
BASKET OF FLOWERS. — Mrs. A. D. Wood	5 00
Second, Mrs. E. M. Gill	4 00

'LANTS.— Collection not exceeding thirty bottles of named
cies and varieties, one bottle of each, Mrs. P. D. Richards 5 00
nd, Miss C. M. Endicott and Miss M. C. Hewett . . 4 00
l, Misses Eleanor and Mollie Doran 3 00

uities : —.

nnewell, Rhododendrons and Azaleas 25 00
mley, Display of Rhododendrons and Azaleas . . . 25 00
P. Cheney, Display of Hardy Rhododendrons . . . 10 00
urlow, Rhododendrons, Azaleas, etc. 6 00
T. Kidder, Rhododendrons 4 00
Gardner, " 3 00
. Ames, Orchids and Javanese Rhododendrons . . . 4 00
Gardner, Pæonies 2 00
mley, Hardy Flowering Trees and Shrubs, etc. . . 15 00
Garden of Harvard University, Display of Herbaceous
ants 10 00
urn, Pelargoniums 3 00
verse, Begonias and Gloxinias 2 00
ollis, Display of German Irises 2 00
. Cowing, Oriental Poppies 1 00
" Aquilegias 1 00
aig, Display 3 00
M. Gill, " 2 00

JUNE 15.

uities : —

C. Thurlow, Display of Pæonies 8 00
eph S. Fay, " " 6 00
ollis, " " 3 00
eph S. Fay, Hybrid Roses 10 00
owing, Spanish Irises 1 00
tcalf, Tulip Tree Flowers 1 00
mley, Display 4 00
Gardner, " 3 00
M. Gill, " 2 00
D. Wood, Cut Flowers 1 00
e L. Grinnell, Native Flowers 2 00

ROSE EXHIBITION.

JUNE 20 AND 21.

Special Prize, Theodore Lyman Fund.

ROSES.— Twenty-four distinct named varieties, three of
ch variety, Hon. Joseph S. Fay 35 00
d, Mrs. J. W. Clark 25 00

Special Prizes, offered by the Society.

Six blooms of Alfred Colomb, Hon. Joseph S. Fay	5 00
Six blooms of Baroness Rothschild, Hon. Joseph S. Fay	5 00
Second, James Comley	4 00
Six blooms of John Hopper, Hon. Joseph S. Fay	5 00
Second, James Comley	4 00
Six blooms of Marquise de Castellane, Hon. Joseph S. Fay	5 00
Six blooms of Merveille de Lyon, Dr. C. G. Weld	5 00
Second, Hon. Joseph S. Fay	4 00
Six blooms of Mme. Gabriel Luizet, J. Eaton, Jr.	5 00
Second, Hon. Joseph S. Fay	4 00
Six blooms of Mme. Victor Verdier, Hon. Joseph S. Fay	5 00
Six blooms of Prince Camille de Rohan	5 00
Twelve blooms of any other variety, Hon. Joseph S. Fay for Magna Charta	7 00
Second, Hon. Joseph S. Fay for Gen. Jacqueminot	5 00
Third, Hon. Joseph S. Fay for Ulrich Brunner	4 00
Fourth, Sumner Coolidge for Ulrich Brunner	3 00

Regular Prizes.

Sixteen distinct named varieties, three of each variety, Hon. Joseph S. Fay	20 00
Second, J. Eaton, Jr.	15 00
Twelve distinct named varieties, three of each variety, J. Eaton, Jr.	15 00
Second, Hon. Joseph S. Fay	10 00
Six distinct named varieties, three of each variety, Hon. Joseph S. Fay	10 00
Second, Dr. C. G. Weld	8 00
Third, J. Eaton, Jr.	6 00
Three distinct named varieties, three of each, Hon. Joseph S. Fay	5 00
Second, J. Eaton, Jr.	4 00
Third, Dr. C. G. Weld	3 00
Twenty-four distinct named varieties, one of each, the Second prize to J. Eaton, Jr.	10 00
Eighteen distinct named varieties, one of each, the Second prize to Dr. C. G. Weld	8 00
Twelve distinct named varieties, one of each, the Second prize to Nathaniel T. Kidder	6 00
Best single bloom of any variety, Hon. Joseph S. Fay for Earl of Dufferin	3 00
Second, Hon. Joseph S. Fay, for Princess Rodocanachi	2 00
Third, Hon. Joseph S. Fay, for Margaret Dickson	1 00
Twelve blooms of not less than four varieties, introduced since 1892, Hon. Joseph S. Fay	10 00
Best single bloom of a variety introduced since 1892, J. Eaton, Jr., for Marchioness of Londonderry	5 00

d, W. W. Astor, Newport, R. I., for Marchioness of Londerry 4 00
ES.— Six distinct named varieties, three clusters of each,
n. Joseph S. Fay 6 00
d, Dr. C. G. Weld 4 00
, John L. Gardner 3 00
'EA ROSES.— Six named varieties, buds admissible, Hon.
eph S. Fay 6 00
DISPLAY.— One hundred bottles of Hardy Roses, buds
nissible, Hon. Joseph S. Fay 10 00
d, Mrs. E. M. Gill 9 00
, W. W. Astor 8 00
h, James Comley 7 00
John L. Gardner 6 00
F ROSES.— Arranged for effect, to be shown the second
, the Second prize to James Comley 8 00
, Mrs. E. M. Gill 6 00
S.— Twelve spikes, Miss M. S. Walker 3 00
d, John L. Gardner 2 00
ILLIAMS.— Thirty spikes, not less than six distinct varie-
, Walter H. Cowing 3 00
d, W. N. Craig 2 00
FLOWERS.— Best arranged, in one of the Society's glass
es, Mrs. A. D. Wood 5 00
d, Mrs. E. M. Gill 4 00

ities : —

ph S. Fay, Harrison Yellow Roses and Persian Yellow
es 3 00
ph S. Fay, Display of Roses 30 00
Jr., Roses 5 00
. Clark, Roses 2 00
ane. " 2 00
. Winter, Hardy Roses 1 00
I. Spooner, Hybrid Roses 1 00
nley, Display of Roses and Flowering Shrubs . . . 10 00
. Walker, Display of Roses, etc. 3 00
llis, Pæonies and Foxgloves 1 00
lwen, Pæonies 1 00
arden of Harvard University, Herbaceous Plants . . 10 00
nning, Herbaceous Plants 4 00
ig, Carnations and Antirrhinums 3 00
I. Gill, Display of Flowers 3 00
ardner, Orchids 2 00
. Thurlow, Flowering Trees and Shrubs 2 00
stitution, *Dracunculus vulgaris* and *Ostrowskya magnifica* 1 00
Cowing, Spanish Irises 1 00
" Shirley Poppies 1 00

F. A. Blake, Petunias 1 00
J. W. Howard, Gloxinias 1 00
Miss M. C. Hewett and Miss C. M. Endicott, Wild Flowers . . 3 00
Mrs. P. D. Richards, Wild Flowers 2 00

JUNE 29.

HARDY ROSES. — Collection, filling fifty vases, one rose in each vase, Hon. Joseph S. Fay 20 00
Second, Hon. Joseph S. Fay 15 00
Third, Mrs. J. W. Clark 10 00
Fourth, James Comley 6 00
IRIS KÆMPFERI. — Fifteen varieties, three of each, in vases, John L. Gardner 6 00
Third, Thomas C. Thurlow 4 00
Six varieties, three of each, in vases, Nathaniel T. Kidder . . 4 00
ENGLISH IRISES. — Best collection, Walter H. Cowing . . . 3 00
Second, Frederick S. Davis 2 00
DELPHINIUMS. — Collection of twenty spikes, John L. Gardner . 5 00
Second, Nathaniel T. Kidder 4 00
Third, Hon. Joseph S. Fay 3 00
LILIUM CANDIDUM. — Twelve spikes, Miss M. S. Walker . . . 4 00
Second, Samuel Hartwell 3 00
Third, Hon. John P. Spaulding 2 00
CAMPANULA MEDIUM. — Collection, not less than twelve bottles, Mrs. E. M. Gill 3 00
Second, Frederick A. Blake 2 00
HERBACEOUS PLANTS. — Forty bottles, J. W. Manning . . . 8 00
Second, Shady Hill Nursery Co. 6 00
BASKET OF FLOWERS. — Mrs. A. D. Wood 5 00
Second, Mrs. E. M. Gill 4 00
Third, James Comley 3 00

Gratuities: —

Hon. Joseph S. Fay, Display of Roses 3 00
James Comley, *Iris Kæmpferi* and Roses 5 00
John L. Gardner, *Iris Kæmpferi* and Delphiniums 2 00
E. Sheppard & Son, Delphiniums and *Iris Kæmpferi* . . . 2 00
Botanic Garden of Harvard University, Display of Herbaceous Plants 10 00
Walter H. Cowing, Shirley Poppies 3 00
Walter H. Cowing, Sweet Williams 1 00
Thomas C. Thurlow, Trees and Shrubs 1 00
Frederick A. Blake, Display of Flowers 3 00
Mrs. E. M. Gill, Display 2 00
Mrs. P. D. Richards, Wild Flowers 2 00

JULY 6.

FLOWERS.— Best arranged, in one of the Society's glass

es, Mrs. E. M. Gill	4 00
nd, Mrs. A. D. Wood	3 00
l, Miss Hattie B. Winter	2 00
LANTS.— Collection, not exceeding forty bottles, Mrs. P. Richards	5 00
nd, Misses Eleanor and Mollie Doran	4 00
l, Miss Alice L. Grinnell	3 00

uities :—

mley, Hybrid Roses	2 00
nning, Herbaceous Plants	2 00
mley, *Iris Kæmpferi.*	2 00
Coolidge, Hollyhocks	4 00
mley, "	1 00

JULY 13.

CKS.— Double, twelve blooms, of twelve distinct colors,

n. Joseph S. Fay	5 00
nd, James Comley	4 00
d, Hon. John P. Spaulding	3 00
oms, of six distinct colors, Hon. Joseph S. Fay	3 00
nd, James Comley	2 00
d, E. S. Converse	1 00
spikes, Hon. John P. Spaulding	3 00
nd, James Comley	4 00
Bouquet, Mrs. A. D. Wood	4 00
nd, Mrs. E. M. Gill	3 00
d, Miss Hattie B. Winter	2 00

uities :—

n P. Spaulding, Hollyhocks	3 00
Coolidge, "	1 00
eph S. Fay, "	1 00
ard & Son, "	1 00
anning, Herbaceous Plants	5 00
L. Ames, Orchids	3 00
raig, Carnations and Sweet Peas	3 00
assinari, Zinnias	1 00
mley, Display	5 00
D. Richards, Wild Flowers	2 00
ce L. Grinnell, " "	2 00

JULY 20.

GLOXINIAS.—Twelve vases, cut blooms, three in each vase, arranged with any foliage, Hon. John P. Spaulding 5 00
Second, Moses S. Stevens 4 00
TUBEROUS BEGONIAS.— Twelve vases, three in each vase, arranged with any foliage, Hon. John P. Spaulding 4 00
HARDY FERNS.— Best Display, Mrs. P. D. Richards 5 00

Gratuities :—

Hon. Joseph S. Fay, Hollyhocks 10 00
Botanic Garden of Harvard University, Tuberous Begonias . . 2 00
Hon. John P. Spaulding, Gladioli 2 00
" " " Sweet Peas 1 00
E. C. Lewis, Sweet Peas 1 00
James Comley, Display 3 00
Mrs. E. M. Gill, " 1 00
Misses Eleanor and Mollie Doran, Native Flowers 3 00
Alice L. and George H. Grinnell, " " 2 00

JULY 27.

SWEET PEAS.— Display, filling thirty vases, arranged with any foliage, Hon. John P. Spaulding 6 00
Second, Frederick A. Blake 4 00
Third, Adin A. Hixon 3 00
Display of named varieties in vases, six sprays in each vase, Frederick A. Blake 4 00
Second, Adin A. Hixon 3 00
Third, Hon. John P. Spaulding 2 00
HERBACEOUS PLANTS.— Forty bottles, Nathaniel T. Kidder . . 8 00
BASKET OF FLOWERS.— For table decoration, Mrs. E. M. Gill . 5 00
Second, Miss Hattie B. Winter. 4 00

Gratuities : —

Hon. Joseph S. Fay, Roses, Sweet Peas, and Phlox 4 00
Botanic Garden of Harvard University, Herbaceous Plants . . 5 00
Hon. Joseph S. Fay, Hollyhocks 2 00
Mrs. F. L. Ames, Collection of twenty-eight varieties of Cypripediums 3 00
Hon. John P. Spaulding, Collection of Cannas 2 00
Oakes Ames, Display of Flowers 2 00
James Comley, Display 2 00
Mrs. P. D. Richards, Wild Flowers 2 00

AUGUST 3.

HARDY NYMPHÆAS.— Collection, with foliage, John Simpkins . 10 00
Second, Oakes Ames 8 00

AL PHLOXES.— Ten distinct named varieties, one spike of	
ch, George Hollis	5 00
ond, Thomas C. Thurlow	4 00
rd, James Comley	3 00
FLOWERS.— For table decoration, James Comley	5 00
ond, Mrs. E. M. Gill	4 00
rd, Miss Hattie B. Winter	3 00
FLOWERS.— Collection, not exceeding forty bottles, Mrs.	
D. Richards	5 00
ond, Oakes Ames	4 00
rd, Misses Eleanor and Mollie Doran	3 00
tuities :—	
Garden of Harvard University, Collection of Phloxes	2 00
seph S. Fay, Hybrid Roses	2 00
hn P. Spaulding, Collection of Gladioli	3 00
Garden of Harvard University, Display of Annuals	4 00
omley, Display of Flowers	2 00

AUGUST 10.

I.— Twenty named varieties, in spikes, J. Warren Clark	6 00
ond, James Comley	5 00
amed varieties, in spikes, Walter H. Cowing	3 00
ond, William E. Endicott	2 00
med varieties, in spikes, John Parker	2 00
ond, Walter H. Cowing	1 00
y of named and unnamed varieties, filling one hundred	
ses, arranged for effect, with any foliage, Hon. John P.	
paulding	8 00
ond, William E. Endicott	6 00
DRUMMONDI.— Thirty vases, not less than six varieties,	
W. Goodell	4 00
ond, Dr. C. G. Weld	3 00
rd, Hon. John P. Spaulding	2 00
tuities : —	
G. Weld, Gladioli	2 00
Patterson, "	1 00
hn P. Spaulding, Gloxinias	2 00
el T. Kidder, Phlox Drummondi	2 00
ummus, Dahlias	3 00
C. Winter, "	2 00
rker, Dahlias, etc.	2 00
mes, Tank of Water Lilies	4 00
Hollis, Phlox and Lilies	4 00
Goodell, Japan Pinks and Begonias	2 00
Comley, Display of Cut Flowers	3 00
M. Gill, Cut Flowers	1 00
D. Richards, Wild Flowers	2 00

AUGUST 24.

ASTERS.— Large Flowered, of all classes, fifty vases, not less than twelve varieties, three flowers in each vase, Joseph H. White 5 00
Second, Hon. Joseph S. Fay 4 00
Third, Mrs. Mary T. Goddard 3 00
Truffaut's Pæony Flowered, thirty blooms, not less than twelve varieties, Hon. Joseph S. Fay 5 00
Second, Nathaniel T. Kidder 4 00
Victoria Flowered, thirty blooms, not less than twelve varieties, Joseph H. White 5 00
Second, E. S. Converse 4 00
Pompon, thirty cut plants, not less than six varieties, the Second prize to Mrs. Mary T. Goddard 3 00
HERBACEOUS PLANTS.— Forty bottles, Nathaniel T. Kidder . . 8 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 4 AND 5.

Special Prize, Theodore Lyman Fund.

AQUATIC PLANTS.— Display, including not less than twelve flowers of Nymphæas or Nelumbiums, Hon. John Simpkins . . 30 00
Second, L. W. Goodell 20 00
Third, Oakes Ames 10 00

Regular Prizes.

ASTERS.— Collection of fifty flowers, one flower in each vase, preference being given to the collection containing the greatest number of classes, named, L. W. Goodell 5 00
Second, Sumner Coolidge 4 00
DAHLIAS.— Double, twelve blooms, distinct named varieties, L. W. Snow 6 00
Second, John Parker 5 00
Third, Lothrop Higgins 4 00
Six blooms, distinct named varieties, Lawrence H. Parker . . 4 00
Second, L. W. Snow 3 00
Third, William C. Winter 2 00
Specimen bloom, Lawrence H. Parker 2 00
Second, L. W. Snow 1 00
Liliputian, display, twenty-five bottles, not less than eight named varieties, William C. Winter 4 00
Second, Aaron Lummus 3 00
Third, William E. Endicott 2 00
Single, display of twenty-five spikes, not less than eight varieties, the Second prize to William C. Winter 3 00

LANCIFOLIUM.— Collection of named varieties, Sumner Coolidge	4 00
cond, Thomas C. Thurlow	3 00
COLUMS.— Display, filling twenty-five vases, Dr. C. G. Weld	4 00
cond, A. L. Cain	3 00
ird, E. S. Converse	2 00
OLDS.— Display of French and African, filling twenty-five vases, Bussey Institution	3 00
cond, Oakes Ames	2 00
s.— Collection of not less than ten named varieties, in spikes, with foliage, R. & J. Farquhar & Co.	10 00
cond, Walter H. Cowing	8 00
OUS BEGONIAS.— Twenty-five spikes, in vases, three spikes in a vase, with foliage, not less than four varieties, Hon. John P. Spaulding	5 00
cond, Dr. C. G. Weld	4 00
ird, Albert H. Brown	3 00
E ZINNIAS.— Twenty-five flowers, not less than six varieties, Dr. C. G. Weld	4 00
cond, L. W. Goodell	3 00
ird, John Jeffries	2 00
DIANTHUSES.— Collection of Annual and Biennial varieties, filling fifty bottles, L. W. Goodell	4 00
OF FLOWERS.— For table decoration, James Comley	5 00
cond, Mrs. E. M. Gill	4 00
ird, Miss Hattie B. Winter	3 00
E PLANTS.— Collection, not exceeding forty bottles, Mrs. P. D. Richards	5 00
cond. Misses Eleanor and Mollie Doran	4 00
ird, Phillips Barry	3 00
ratuities : —	
m C. Winter, Display of Dahlias	4 00
S. Cowles, Newport, R. I., Display of Canna, Mrs. Fairman Rogers	2 00
Goodell, Sweet Peas and Begonias	2 00
as C. Thurlow, Perennial Phloxes	1 00
Comley, Display of Cut Flowers	2 00
E. M. Gill, " " "	1 00

SEPTEMBER 14.

ACEOUS PLANTS.— Forty bottles, Nathaniel T. Kidder	8 00
econd, J. W. Manning	6 00
ratuity : —	
Comley, Vase of Flowers	3 00

SEPTEMBER 21.

PERENNIAL ASTERS.— Display of Native or Introduced species and varieties, George Hollis 5 00
Second, Mrs. P D. Richards 4 00

Gratuities :—

R. & J. Farquhar & Co., Display of Cannas, Gladioli, etc. . . 5 00
R. & J. Farquhar & Co., Display of Annuals 2 00
Misses Eleanor and Mollie Doran, Wild Flowers 2 00

OCTOBER 2.

Gratuities :—

James Comley, *Bougainvillea glabra* 2 00
Walter H. Cowing, Display of Cannas 3 00

CHRYSANTHEMUM SHOW.

NOVEMBER 5, 6, 7, AND 8.

Special Prizes from the Josiah Bradlee Fund.

Twenty-five blooms, of twenty-five distinct varieties, named, Hon. John Simpkins, a piece of plate, or value in money . 20 00
Second, Walter Hunnewell 15 00
Third, Mrs. B. P. Cheney 10 00
Six vases of six named varieties, ten blooms each, E. M. Wood & Co. 30 00
Second, C. V. Whitten 25 00

Special Prizes offered by the Society.

Best Seedling, never disseminated, three blooms, Red, J. Brydon, for Mars 5 00
Best Seedling, never disseminated, three blooms, Pink, E. G. Hill, Richmond, Ind., for Mrs. Perrine 5 00
Best Seedling, never disseminated, three blooms, White, J. Eaton, Jr., for J. H. Woodford 5 00
Best Seedling, never disseminated, three blooms, Yellow, Mann Brothers, for Theo 5 00
Best Seedling, never disseminated, three blooms, any other color, Henry A. Gane, for West Newton. 5 00

Regular Prizes.

Twelve cut blooms, Incurved, named, in vases, Joseph H. White 10 00
Twelve cut blooms, Japanese, named, in vases, Nathaniel T. Kidder 10 00
Second, Joseph H. White 6 00
Third, W. K Wood 4 00

lve cut blooms, Japanese Incurved, named, in vases, Hon. John Simpkins 10 00
econd, Joseph H. White 6 00
hird, W. K. Wood 4 00
lve cut blooms, Anemone, named, in vases, Hon. John Simpkins 10 00
econd, James L. Little 6 00
cut blooms, Incurved, named, in vases, William Slack, Stamford, Conn. 6 00
econd, W. K. Wood 4 00
hird, Joseph H. White 2 00
cut blooms, Japanese, named, in vases, Hon. John Simpkins 6 00
econd, William Slack, ... 4 00
cut blooms, Japanese Incurved, named, in vases, E. S. Converse 6 00
econd, Mrs. B. P. Cheney 4 00
hird, James L. Little 2 00
cut blooms, Reflexed, named, in vases, John Simpkins . . 6 00
econd, Joseph H. White 4 00
hird, Mrs. B. P. Cheney 2 00
cut blooms, Anemone, named, in vases, J. W. Howard . . 6 00
econd, Dr. C. G. Weld 4 00
hird, E. S. Converse 2 00
lve sprays, Pompons, not less than six named varieties, the econd prize to J. W. Howard 4 00
hird, Bussey Institution 3 00
ve best varieties, named, introductions of the current year, Hon. John Simpkins 8 00
econd, T. D. Hatfield 6 00
ird, William Slack 4 00
of blooms, on long stems, arranged in the Society's large hina vases, Hon. John Simpkins 18 00
econd, Hon. John Simpkins 16 00
ird, Mrs. B. P. Cheney 14 00
urth, Joseph H. White 12 00
th, J. W. Howard 10 00
vase of ten blooms, on long stems, Red, named, Edmund Wood & Co., for E. Molyneux 10 00
econd, Jeanne W. Howard, for Jeanne Delaux 8 00
vase of ten blooms, on long stems, Pink, named, Edmund Wood & Co., for Viviand Morel. 10 00
econd, Mrs. B. P. Cheney, for Viviand Morel 8 00
ird, Mrs. B. P. Cheney, for Inter-Ocean 6 00
vase of ten blooms, on long stems, White, named, Edmund Wood & Co., for Mrs. Jerome Jones 10 00
econd, Mrs. B. P. Cheney, for Mutual Friend 8 00
vase of ten blooms, on long stems, Yellow, named, Edmund Wood & Co., for Golden Wedding 10 00

Second, Mrs. B. P. Cheney, for Major Bonnaffon	8 00
Third, Mrs. B. P. Cheney, for H. Sunderbruch	6 00
Best vase of ten blooms, on long stems, any other color, named, Edmund Wood & Co., for Robert McInnes	10 00
Second, W. K. Wood, for Golden Hair	8 00

Gratuities: —

David Nevins, Display of Chrysanthemums	10 00
Arthur Hunnewell, Display of Chrysanthemums	5 00
William Nicholson, " " "	5 00
E. S. Converse, Collection of Chrysanthemums	5 00
James Comley, Display of Chrysanthemums	4 00
Mrs. E. M. Gill, Three vases Chrysanthemums	5 00
Hon. John Simpkins, Vase of Chrysanthemums, Pitcher & Manda	4 00
Hon. John Simpkins, Collection of Anemone Flowered Chrysanthemums	10 00
L. W. Goodell, Anemone Flowered Chrysanthemums	1 00
Mrs. E. M. Gill, Chrysanthemums	2 00
William Nicholson, Carnations	3 00
Peter Fisher. "	3 00
Oakes Ames, Nymphæas	2 00
David Allan, *Dipladenia profusa*	2 00

NOVEMBER 23.

Gratuity: —

James Comley, Display of Chrysanthemums	5 00

DECEMBER 7.

Gratuity: —

James Comley, Display of Chrysanthemums	3 00

DECEMBER 21.

Gratuity: —

James Comley, Collection of Chrysanthemums	3 00

SOCIETY'S GOLD MEDAL.

July 9. Michael H. Walsh, Seedling Hybrid Rose, Michael H. Walsh.

SOCIETY'S SILVER MEDALS.

July 13. William Robinson, Seedling Sobralia, *Sobralia Amesiæ xantholeuca × Williamsii.*

Annual Exhibition, September 4 and 5. W. W. Rawson & Co., Collection of Dahlias.

APPLETON SILVER MEDALS.

August 3. Hon. John Simpkins, Collection of Hardy Nymphæas.

September 14. Nathaniel T. Kidder, Herbaceous Plants.

APPLETON BRONZE MEDAL.

ember 14. J. W. Manning, Herbaceous Plants.

FIRST CLASS CERTIFICATES OF MERIT.

ch 16. Alexander McKay, Superior Cultivation of Hybrid Roses under glass.

" Sewall Fisher, Seedling Carnation Crystal.

" Frederick Dorner, Lafayette, Ind., Seedling Carnation Storm King.

4. William Nicholson, Superior Cultivation of Carnations.

1. James Comley, Seedling Rhododendron.

" Thomas C. Thurlow, *Symplocos Japonica.*

lodendron Show, June 6, 7. Mrs. F. L. Ames, *Aristolochia Gigas Sturtevantii.*

Show, June 20, 21. James Comley, Seedling *Rhododendron maximum.*

13. Mrs. F. L. Ames, Javanese Rhododendrons.

ist 3. Mrs. F. L. Ames, New Montbretias.

ist 3. Hon. John Simpkins, *Nymphæa Laydekeri lilacina.*

" " " " " *Marliacea flammea.*

" " " " " " *Robinsoniana.*

ial Exhibition, September 4, 5. J. W. Howard, New Chrysanthemum-flowered Double Sunflower.

" " " " P. Bisset, Seedling Nelumbium.

santhemum Show, November 5. T. D. Hatfield, New Seedling Chrysanthemum Sundew.

" " " " Henry A. Gane, New Seedling Anemone-flowered Chrysanthemum Marcia Jones.

HONORABLE MENTIONS.

al Exhibition, September 4, 5. Robert Christie, Collection of Seedling Cannas.

mber 14. Oakes Ames, *Nelumbium album grandiflorum.*

COMPLIMENTARY NOTICE.

santhemum Show, November 5. Henry A. Gane, Seedling Chrysanthemums.

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1895.

By E. W. WOOD, CHAIRMAN.

There was less injury to fruit-bearing trees, canes, and vines during the winter of 1894–5 than the average in past years; the extremes of temperature were less, and the ground was more continuously covered with snow, some of the snow falling in November remaining on the ground until after the middle of March.

Several exceptionally warm days in early spring pushed forward the fruit buds, and being followed later by frosts, strawberries and grapes were severely injured, in many places the earlier varieties proving a total failure. The season was favorable for the growth of fruit; while the rainfall was not up to the average it was so evenly distributed that there was less injury from drought than in many of the other States.

It being the off year for Apples the exhibitions of that fruit, especially the late varieties, have not compared favorably with those of the previous years and where the trees were not properly cared for and sprayed, the fruit was so wormy and knurled as to be of little value. Of Pears there has been an average crop and some fine specimens were shown at the exhibitions. There has been little complaint of the blight among the growers the past

and the pear continues to be less subject to injury from pests than most of our fruits.

Peach crop, the past season, has been the largest for many the fruit buds were not so badly killed during the winter previous seasons, and there have been good exhibitions of this Cherries have been shown in less quantity than usual e of late frosts in some localities and rain at the time of ng. There have been fair exhibits of Plums and the recent uction of Japanese varieties has caused an increased st in the cultivation of this fruit. There are several es of good quality that seem well adapted to our soil and e; they are being tested and we shall ere long be able to more definitely of their practical value.

fungous and insect enemies of fruit, where undisturbed, done the usual amount of injury, but further experience to prove that the damage from these pests may be prevented y much reduced by careful and systematic spraying. The aterpillar has not been as numerous as in recent years but nker worm in some localities destroyed all prospects of a and the ever present codling moth was as numerous as in any us year, and as the crop of fruit was small a larger propor- han usual bore evidence of his destructive work.

re have been few new fruits shown the past year requiring l mention. The Alice grape, a white variety, from Ward nn, of Cliftondale, N. Y., was deemed of so much promise he Committee awarded a First Class Certificate of Merit to iginator. Liberal prizes have been offered by Ex-President g the past two years for varieties of Strawberries not usly exhibited, but the competition has not shown anything g as many points of excellence as varieties already in general ation. Of recent introductions, the Mackintosh Apple is sing; it is of good quality, bright red in color, slightly medium size, and an excellent fruit for the table. At the al Exhibition, October 2 and 3, William C. Clapp, of ester, showed the seedling pear Harris, which was then rfect condition. It was of medium size and excellent y and seemed to the Committee worthy of cultivation. The all Strawberry easily took the lead as an exhibition berry, ts large size, good quality, and perfect form and color mend it for the amateur, but the plants having been sold in

limited quantities until the past season it is impossible to speak positively of its merits for field culture until the close of next season.

The Committee have awarded in premiums and gratuities $1,528, leaving an unexpended balance of $272.

E. W. Wood,
O. B. Hadwen,
C. F. Curtis,
Warren Fenno,
J. Willard Hill,
Benjamin G. Smith,
Samuel Hartwell,
} *Committee.*

ES AND GRATUITIES AWARDED FOR FRUITS, 1895.

January 12.

atuities :—

McWilliam, Foreign Grapes	$3 00
A. Hall, Collection of Pears	1 00
ewis, " " "	1 00

February 2.

atuities :—

V. Wilson, Display of Tropical Fruits	5 00
ewis, Collection of Pears	1 00
A. Hall, " " "	1 00
adwen, " " Apples	1 00

SPRING EXHIBITION.

March 26, 27, 28, and 29.

Apples.— Baldwin, George C. Rice	3 00
ond, J. V. Fletcher	2 00
rd, Marshall W. Chadbourne	1 00
ern Spy, F. J. Boyden	3 00
ond, George C. Rice	2 00
rd, George V. Fletcher	1 00
ry Russet, Benjamin P. Ware	3 00
ond, C. C. Boyden	2 00
rd, Littlefield Farm	1 00
kins King, George C. Rice	3 00
ond, Louis J. Kendall	2 00
rd, Samuel Hartwell	1 00
ther variety, George C. Rice, Yellow Bellflower	3 00
ond, George C. Rice, Mackintosh	2 00
rd, William Everett, Jacobs Sweet	1 00
Pears.— Any variety, Leverett M. Chase, Anjou	3 00
ond, Leverett M. Chase, Vicar	2 00
erries.— One pint, James Comley	3 00

atuities :—

Vight, Strawberry plants in fruit	1 00
l W. Chadbourne, Maple Syrup	1 00

APRIL 6.

Gratuity :—

James Comley, Strawberries 2 00

MAY 4.

Gratuities: —

Rev. Calvin Terry, Collection of Apples 1 00
Elisha S. Converse, Peaches 1 00

MAY 11.

Gratuity :—

William Brown, Peaches 1 00

MAY 18.

Gratuities: —

Benjamin P. Ware, Collection of Apples 1 00
William Brown, Peaches 1 00

MAY 25.

Gratuity :—

Elisha S. Converse, Nectarines 1 00

JUNE 6.

Gratuities: —

William Doran & Son, Strawberries 2 00
William C. Winter, Peaches 1 00

JULY 14.

Gratuities:—

James Comley, Peaches 2 00
J. W. Howard, Marshall Strawberries 1 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 20 AND 21.

Special Prizes from the Theodore Lyman Fund.

STRAWBERRIES.—For the best four quarts of any variety, Hon. Joseph S. Fay, for Marshall, the Lyman Plate, value 20 00
Second, Sumner Coolidge, " " " " " " 16 00
Third, J. W. Howard, " " " " " " 12 00
Fourth, Warren Heustis & Son, " " " " " 10 00
Fifth, Marshall F. Ewell, " " " " " 8 00

Special Prizes Offered by the Society.

For the best two quarts of any variety, to be judged by points,
Warren Heustis & Son, Marshall 6 00
Second, Marshall F. Ewell, " 5 00
Third, George V. Fletcher, " 4 00
Fourth, I. E. Coburn, Jesse 3 00

Regular Prizes.

largest and best collection, not less than twenty baskets of
quarts each, and not less than five varieties, George F.
heeler 25 00
nd, Isaac E. Coburn 20 00
skets, not less than three varieties, two quarts each, Isaac
Coburn 15 00
ge V. Fletcher 12 00
skets of one variety, two quarts each, Mrs. J. W. Clark,
mfret, Conn., ... 8 00
arts of Belmont, J. W. Howard 4 00
nd, George V. Fletcher 3 00
l. William Doran & Son 2 00
, I. E. Coburn 4 00
nd, Sumner Coolidge 3 00
l, Oliver R. Robbins 2 00
on, Wilfred Wheeler 4 00
nd. George F. Wheeler 3 00
Downing, Wilfred Wheeler 4 00
nd, George F. Wheeler 3 00
l, William Doran & Son 2 00
t, the Second prize to Isaac E. Coburn 3 00
l, William C. Winter 2 00
rland, the Third prize to George F. Wheeler . . . 2 00
saac E. Coburn 4 00
nd, George V. Fletcher 3 00
l, William C. Winter 2 00
George V. Fletcher 4 00
nd, George F. Wheeler 3 00
ll, Hon. Joseph S. Fay 4 00
nd, E. W. Wood 3 00
l, Isaac E. Coburn 2 00
Prolific, the Second prize to George F. Wheeler . . 2 00
ss, the Third prize to William Doran & Son . . . 2 00
ier variety, Sumner Coolidge, Hersey 4 00
nd, Isaac E. Coburn, Haverland 3 00
l, Mrs. J. W. Clark, " 2 00
on of not less than six varieties, one quart of each, George
Fletcher 8 00
nd, Isaac E. Coburn 6 00
.— Two quarts of any variety, George V. Fletcher . . 4 00
nd, Edwin Hastings 3 00
l, Joshua C. Stone 2 00
GRAPES.—Two bunches of any variety, Elisha S. Converse 6 00
nd, Winter Brothers 4 00
PEACHES.— Six specimens of any variety, William C.
nter 3 00

JUNE 29.

STRAWBERRIES.— One quart of any variety, J. W. Howard	3 00
Second, Warren Heustis & Son	2 00
Third, Isaac E. Coburn	1 00
CHERRIES.— Black Tartarian, Leverett M. Chase	3 00
Second, James L. Duncan	2 00
Third, Charles B. Travis	1 00
Downer, Marshall W. Chadbourne	3 00
Any other variety, A. T. Brown, Reine Hortense	3 00
Second, Charles B. Travis, Elton	2 00
Third, Marshall W. Chadbourne, White Heart	1 00
Gratuity :—	
William Doran & Son, Raspberries	1 00

JULY 6.

CHERRIES.—Two quarts of any variety, Charles F. Curtis, Downer	3 00
Second, E. S. Chapell, Napoleon	2 00
Third, Charles F. Curtis, Hyde's Seedling	1 00
RASPBERRIES.— Two quarts of any variety, William Doran & Son, Red Antwerp	3 00
Second, Josiah W. Talbot, Seedling	2 00
CURRANTS.— Two quarts of any Red variety, W. N. Craig, Fay's	4 00
Second, William Doran & Son, Fay's	3 00
Third, " " " " Versaillaise	2 00
Two quarts of any White variety, Elisha S. Converse	3 00
Second, Samuel J. Trepess	2 00

JULY 13.

RASPBERRIES.— Collection of not less than four varieties, two quarts of each, William Doran & Son	4 00
Two quarts of any variety, Elisha S. Converse	3 00
Second, Sumner Coolidge	2 00
BLACKCAPS.— Two quarts of any variety, Hon. John P. Spaulding	2 00
CURRANTS.— One quart of Versaillaise, W. N. Craig	2 00
Second, Elisha S. Converse	1 00
One quart of any other Red variety, William C. Winter	2 00
Second, Hon. John P. Spaulding	1 00
One quart of any White variety, Elisha S. Converse	2 00
Second, Samuel J. Trepess	1 00
GOOSEBERRIES.—Two quarts of any Native variety, Joseph S. Chase, Triumph	3 00
Second, Amos Bates, Bates's Seedling	2 00
Third, E. W. Wood, " "	1 00

JULY 20.

RRIES.—Two quarts of any variety, Hon. John P. Spaulding	3 00
ond, Mrs. E. J. Cutter	2 00
rd, Sumner Coolidge	1 00
rs.—One quart of any Red variety, William Doran & Son	3 00
ond, W. N. Craig	2 00
rd, Elisha S. Converse	1 00
uart of any White variety, Elisha S. Converse	2 00
ERRIES.—Two quarts of any Foreign variety, Dr. Walter G. endall	3 00
ond, Benjamin P. Ware	2 00
rd, W. N. Craig	1 00
tuities:—	
vin Terry, Pears	1 00
C. Winter, Peaches	1 00

JULY 27.

ERRIES.—Two quarts of any variety, Marshall W. Chadbourne	3 00
ond, Rev. Calvin Terry	2 00
—Tetofsky, Samuel Hartwell	3 00
ond, Marshall W. Chadbourne	2 00
-Summer Doyenne, E. S. Converse	3 00
ond, Warren Fenno	2 00
rd, Charles N. Brackett	1 00
ther variety, Mary Curtis, Giffard	3 00
ond, A. T. Brown, "	2 00
rd, William Milman "	1 00
.—Any variety, Charles S. Smith	3 00
ond, Nathaniel T. Kidder	2 00
tuities:—	
Wellington, Apricots	1 00
derick L. Ames, Nectarines	2 00
C. Winter, Peaches	1 00

AUGUST 3.

—Red Astrachan, Samuel G. Damon	3 00
ond, Warren Fenno	2 00
rd, S. F. & F. L. Weston	1 00
Bough, Sumner Coolidge	3 00
ond, William T. Hall	2 00
rd, George V. Fletcher	1 00
ther variety, Joshua C. Stone, Williams	3 00
ond, Sumner Coolidge, "	2 00
rd, P. G. Hanson, "	1 00

PEARS.— Giffard, Mary Curtis 3 00
Second, A. T. Brown 2 00
Third, Rufus T. Tobey 1 00
Any other variety, Sumner Coolidge, Clapp's Favorite . . . 3 00
Second, A. T. Brown 2 00
Third, Elisha S. Converse 1 00
BLACKBERRIES.— Two quarts of any variety, Marshall W. Chadbourne 3 00
Second, Rev. Calvin Terry 2 00
PEACHES.— Any variety, Mrs. N. D. Harrington, Amsden . . 3 00
Second, Charles S. Smith, Alexander 2 00
Third, Mrs. N. D. Harrington, Alexander 1 00

Gratuities : —

William Everett, Seedling Gooseberry 1 00
Mrs. Frederick L. Ames, Nectarines 1 00

AUGUST 10.

APPLES.— Oldenburg, William T. Hall 3 00
Second, J. V. Fletcher 2 00
Any other variety, Joshua C. Stone, Williams 3 00
Second, Varnum Frost " 2 00
Third, Sumner Coolidge, " 1 00
PEARS.— Clapp's Favorite, George V. Fletcher 3 00
Second, Sumner Coolidge 2 00
Third, S. Klaus 1 00
Manning's Elizabeth, Elisha S. Converse 2 00
Second, Warren Fenno 1 00
Any other variety, Sumner Coolidge, Bartlett 2 00
Second, Samuel G. Damon, " 1 00
APRICOTS.— Any variety, Andrew Wellington, Large Early . . 3 00
Second, Andrew Wellington, Alexander 2 00
PEACHES.— Any variety, Sumner Coolidge, Early Rivers . . 3 00
Second, Leverett M. Chase, Early Rivers 2 00
Third, William C. Winter, Waterloo 1 00
Six specimens of cold house or pot culture, William C. Winter . 3 00
FOREIGN GRAPES.— Two bunches of any variety, Winter Brothers, Muscat of Alexandria 5 00
Second, Winter Brothers, Black Hamburg 4 00

Gratuity : —

T. Carleton, Collection of Grapes 2 00

AUGUST 17.

APPLES — Chenango, Samuel Hartwell 3 00
Williams, Joshua C. Stone 3 00
Second, Charles F. Curtis 2 00
Third, Varnum Frost 1 00

ther variety, Warren Fenno, Summer Pippin	3 00
ond, Samuel G. Damon, Porter	2 00
rd, Samuel Hartwell, Bietigheimer	1 00
– Rostiezer, S. F. & F. L. Weston	3 00
ond, Marshall W. Chadbourne	2 00
rd, Charles N. Brackett	1 00
, Leverett M. Chase	3 00
ond, Clifford Weld	2 00
rd, Warren Fenno	1 00
ther variety, A. T. Brown	3 00
ond, Sumner Coolidge	2 00
rd, Samuel G. Damon	1 00
s.— Any variety, Sumner Coolidge	3 00
ond, William C. Winter	2 00
– Japanese, any variety, William C. Winter, Abundance	3 00
ond, Joseph S. Chase, Abundance	2 00
ther variety, George V. Fletcher, Bradshaw	3 00
ond, Mrs. Mary T. Goddard "	2 00
rd, M. L. Whitney, Washington	1 00

AUGUST 24.

— Foundling, the Second prize to Warren Fenno	2 00
nstein, Samuel Hartwell	3 00
ond, Joshua C. Stone	2 00
rd, Charles S. Smith	1 00
n's Blush, Dr. Walter G. Kendall	3 00
ond, Joshua C. Stone	2 00
rd, Warren Fenno	1 00
, Sumner Coolidge	3 00
ond, Samuel G. Damon	2 00
rd, George V. Fletcher	1 00
ier Pippin, Warren Fenno	3 00
ond, Samuel Hartwell	2 00
ther variety, Samuel Hartwell, Bietigheimer	3 00
ond, Joshua C. Stone, Williams	2 00
rd, Warren Fenno, Garden Royal	1 00
– Andrews, Elisha S. Converse	3 00
ond, Samuel G. Damon	2 00
rd, Joshua C. Stone	1 00
tt, William Milman	3 00
ond, George V. Fletcher	2 00
rd, Samuel G. Damon	1 00
ock, Charles N. Brackett	3 00
ond, Charles F. Curtis	2 00
rd, Sumner Coolidge	1 00
ther variety, A. T. Brown, Flemish Beauty	3 00
ond, Warren Fenno, Souvenir du Congrés	2 00
rd, George V. Fletcher, Clapp's Favorite	1 00

PEACHES.— Single dish, of any variety, Mrs. N. D. Harrington . 3 00
Second, George W. Jameson 2 00
Third, John L. Bird 1 00
PLUMS.—Bradshaw, Mrs. Mary T. Goddard 3 00
Second, George V. Fletcher 2 00
Third, William H. Hunt 1 00
Any other variety, Mrs. Mary T. Goddard, Washington . . 3 00
Second, William C. Winter, Abundance 2 00
Third, Joseph S. Chase, " 1 00
NATIVE GRAPES.— Six bunches of any variety, Samuel G. Damon, Moore's Early 3 00

AUGUST 31.

Gratuity :—

Mrs. N. D. Harrington, Peaches 1 00

SEPTEMBER 3.

Gratuities : —

W. D. Hinds, Collection of Peaches 2 00
Mrs. J. W. Clark, Pomfret, Conn., Collection of Foreign Grapes . 5 00

SEPTEMBER 14.

APPLES.— Gravenstein, Samuel Hartwell 3 00
Second, William T. Hall 2 00
Third, Charles S. Smith 1 00
Maiden's Blush, Joshua C. Stone 3 00
Second, Thomas L. Perkins 2 00
Third, Warren Fenno 1 00
Porter, George V. Fletcher 3 00
Second, Sumner Coolidge 2 00
Third, Samuel G. Damon 1 00
Any other variety, Samuel Hartwell, Stump 3 00
Second, Warren Fenno, Washington Strawberry . . . 2 00
Third, P. G. Hanson, Mackintosh 1 00
CRAB APPLES.— Twenty-four specimens, Transcendent, Warren Fenno 2 00
Second, Mrs. N. D. Harrington 1 00
Any other variety, Marshall W. Chadbourne, Hyslop . . . 2 00
Second, Joshua C. Stone, Hyslop 1 00
PEARS.— Bartlett, William Milman 3 00
Second, George V. Fletcher 2 00
Third, Mrs. N. D. Harrington 1 00
Belle Lucrative, Elisha S. Converse 3 00
Second, G. L. Brown 2 00
Third, Mrs. Mary Langmaid 1 00
Boussock, Warren Fenno 3 00
Second, Charles E. Swain 2 00
Third, Charles N. Brackett 1 00

Charles F. Curtis	3 00
nd, William S. Janvrin	2 00
l, Warren Fenno	1 00
e of Autumn, William Milman	3 00
nd, Warren Heustis & Son	2 00
l, William H. Hunt	1 00
ir du Congrés, A. T. Brown	3 00
nd, Dr. Walter G. Kendall	2 00
l, Charles N. Brackett	1 00
her variety, William Milman, Seckel	3 00
nd, C. A. Jones, Louise Bonne of Jersey	2 00
l, Warren Fenno, Pratt	1 00
— Crawford's Early, P. G. Hanson	3 00
nd, Samuel G. Damon	2 00
l, Mrs. Mary T. Goddard	1 00
Mrs. Mary Langmaid	3 00
nd, Sumner Coolidge	2 00
l, P. G. Hanson	1 00
on Freestone, Sumner Coolidge	3 00
nd, W. D. Hinds	2 00
l, Charles S. Smith	1 00
the World, Mrs. N. D. Harrington	3 00
nd, Leverett M. Chase	2 00
l, W. D. Hinds	1 00
her variety, W. D. Hinds, Crosby	3 00
nd, Mrs. N. D. Harrington, Seedling	2 00
l, Charles S. Smith, Susquehanna	1 00
ORCHARD HOUSE CULTURE.— Any variety, Joseph H. hite	4 00
nd, William C. Winter	3 00
ES.— Any variety of outdoor culture, C. C. Donnell	2 00
Imperial Gage, George V. Fletcher	3 00
n, Charles F. Curtis	3 00
rd, George V. Fletcher	3 00
nd, P. G. Hanson	2 00
l, Samuel G. Damon	1 00
her variety, Mrs. Mary T. Goddard, Green Gage	3 00
nd, Mrs. Mary T. Goddard	2 00
l, " " " "	1 00
GRAPES.— August Rose, Joshua C. Stone	3 00
nd, Horace Carlton	2 00
, Benjamin G. Smith	3 00
n, " " "	3 00
nd, Samuel G. Damon	2 00
oit, F. J. Kinney	3 00
nd, Samuel G. Damon	2 00

Moore's Early, Mrs. Mary T. Goddard	3 00
Second, Benjamin G. Smith	2 00
Third, Samuel G. Damon	1 00
Any other variety, F. J. Kinney, Worden	3 00
Second, Benjamin G. Smith, "	2 00
Third, Samuel G. Damon, Delaware	1 00
Any variety from girdled vines, F. J. Kinney, Worden	3 00

Gratuity : —

W. D. Hinds, Collection of Peaches	2 00

SEPTEMBER 21.

Gratuity : —

Joseph S. Chase, Collection of Grapes	3 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

OCTOBER 2 AND 3.

Special Prizes.

Samuel Appleton Fund.

APPLES.— Baldwin, Sumner Coolidge	5 00
Hubbardston, Samuel Hartwell	5 00
PEARS.— Bosc, Samuel G. Damon	5 00
Sheldon, " " "	5 00

Benjamin V. French Fund.

APPLES.— Gravenstein, Samuel Hartwell	5 00
Rhode Island Greening, George V. Fletcher	5 00

Marshall P. Wilder Fund.

PEARS.— Anjou, A. T. Brown	4 00
Second, Mrs. Mary Langmaid	3 00
Third, Samuel G. Damon	2 00
Fourth, William Patterson	1 00
Bartlett, George V. Fletcher	4 00
Second, Samuel G. Damon	3 00
Third, Varnum Frost	2 00
Fourth, Samuel Lake	1 00
GRAPES.— Concord, George W. Jameson	3 00
Second, Samuel G. Damon	2 00
Worden, F. J. Kinney	3 00
Second, Benjamin G. Smith	2 00
Third, William C. Winter	1 00

Special Prizes offered by the Society.

–Anjou, Samuel W. Damon	5 00
l, A. T. Brown	5 00
s.— Any variety, Mrs. Mary T. Goddard	5 00
Grapes.— Twelve bunches of any variety, Benjamin G. mith	5 00

Regular Prizes, Theodore Lyman Fund.

— Baldwin, Joshua C. Stone	4 00
ond, E. P. Tewksbury	3 00
rd, Sumner Coolidge	2 00
Codlin, the Second prize to Warren Fenno	1 00
Orange or Holden, Samuel Hartwell	3 00
use, Joshua Coolidge	3 00
ond, William Milman	2 00
rd, Sumner Coolidge	1 00
Mundi, Samuel Hartwell	3 00
ond, Mrs. J. W. Clark	2 00
n Russet, H. E. Rich	2 00
nstein, Samuel Hartwell	4 00
ond, William T. Hall	3 00
rd, B. N. Moore	2 00
ardston, Joshua C. Stone	4 00
ond, Samuel Hartwell	3 00
rd, Marshall W. Chadbourne	2 00
Russet, E. T. Creesy	3 00
ond, Samuel Hartwell	2 00
ntosh, Everett Smith	3 00
ond, Samuel Hartwell	2 00
rd, C. M. Handley	1 00
n's Blush, Warren Fenno	2 00
ond, T. L. Perkins	1 00
r, Warren Fenno	3 00
ern Spy, George V. Fletcher	3 00
ond, Samuel G. Damon,	2 00
rd, C. M. Handley	1 00
, George V. Fletcher	3 00
ond, Samuel G. Damon	2 00
rd, C. M. Handley	1 00
Sweet, George V. Fletcher	3 00
Island Greening, Sumner Coolidge	4 00
ond, Joshua C. Stone	3 00
rd, Arthur F. Coolidge	2 00
ry Russet, Joshua C. Stone	4 00
ond, William C. Clapp	3 00
rd, Sumner Coolidge	2 00

Sutton, the Second prize to H. E. Rich	2 00
Tompkins King, Mrs. H. A. Small	3 00
Palmer, Samuel Hartwell	3 00
Washington, Strawberry, Joshua C. Stone	2 00
Wealthy, Samuel Hartwell	3 00
Any other variety, Benjamin L. Priest, New York Pippin	3 00
Second, William Everett, Jacobs Sweet	2 00
Third, Samuel Hartwell, Yellow Bellflower	1 00
CRAB APPLES.— Hyslop, Joshua C. Stone	2 00
Second, Marshall W. Chadbourne	1 00
Any other variety, Samuel H. Warren	2 00

Society's Prizes.

PEARS.— Angouleme, Samuel G. Damon	4 00
Second, A. T. Brown	3 00
Third, Mary Curtis	2 00
Fourth, Varnum Frost	1 00
Bosc, Richard Poison	4 00
Second, Mrs. George S. Harwood	3 00
Third, A. T. Brown	2 00
Fourth, Sumner Coolidge	1 00
Clairgeau, Samuel G. Damon	3 00
Second, Willlam T. Hall	2 00
Third, Willard P. Plimpton	1 00
Comice, A. T. Brown	3 00
Second, William Everett,	2 00
Third, Charles N. Brackett	1 00
Dana's Hovey, A. T. Brown	4 00
Second, Willard P. Plimpton	3 00
Third, Charles E. Swain	2 00
Fourth, E. W. Wood	1 00
Diel, Charles E. Swain	3 00
Second, A. T. Brown	2 00
Third, Samuel G. Damon	1 00
Fulton, Elisha S. Converse	3 00
Second, S. F. & F. L. Weston	2 00
Third, John L. Bird	1 00
Hardy, Charles F. Curtis	3 00
Second, William Milman	2 00
Third, Warren Fenno	1 00
Howell, Benjamin G. Smith	3 00
Second, Joseph C. Stone	2 00
Third, Mrs. Mary Langmaid	1 00
Josephine of Malines, Samuel G. Damon	3 00
Second, Warren Fenno	2 00
Third, John L. Bird	1 00

rence, A. T. Brown	3 00
econd, Marshall W. Chadbourne	2 00
hird, William T. Hall	1 00
ise Bonne of Jersey, Aaron S. McIntosh	3 00
econd, Thomas M. Davis	2 00
hird, John W. Martin	1 00
ie Louise, Charles E. Swain	3 00
econd, Samuel G. Damon	2 00
hird, Sumner Coolidge	1 00
riam, Sumner Coolidge	3 00
econd, Samuel G. Damon	2 00
hird, Warren Heustis & Son	1 00
ndaga, John J. Merrill	3 00
econd, Leverett M. Chase	2 00
hird, Warren Fenno	1 00
tel, J. McEttrick	4 00
econd, C. H. Plimpton	3 00
hird, Charles E. Swain	2 00
ourth, A. T. Brown	1 00
don, Samuel G. Damon	4 00
econd, Mrs. N. D. Harrington	3 00
hird, Sumner Coolidge	2 00
ourth, Mrs. Mary Langmaid	1 00
venir du Congrés, A. T. Brown	3 00
hird, Marshall W. Chadbourne	1 00
Michael Archangel, Benjamin G. Smith	3 00
econd, Warren Heustis & Son	2 00
hird, Warren Fenno	1 00
erfin, Sumner Coolidge	3 00
econd, Warren Fenno	2 00
hird, Samuel G. Damon	1 00
aniste, Charles E. Swain	3 00
econd, Mrs. Emmons	2 00
hird, Elisha S. Converse	1 00
r, A. T. Brown	3 00
econd, Elisha S. Converse	2 00
hird, Sumner Coolidge	1 00
ter Nelis, Thomas M. Davis	3 00
econd, A. T. Brown	2 00
hird, Clifford Weld	1 00
other variety, William C. Clapp, Harris	3 00
econd, Warren Fenno, Pratt	2 00
hird, Elisha S. Converse, Kingsessing	1 00
es.— Orange, A. F. Coolidge	3 00
econd, George V. Fletcher	2 00
hird, Mrs. Mary T. Goddard	1 00

Pear, George V. Fletcher	3 00
Second, Benjamin G. Smith	2 00
Rea, George S. Curtis	3 00
Second, Mrs. George S. Harwood	2 00
Third, Mrs. Mary T. Goddard	1 00
Any other variety, Charles S. Smith	3 00
Second, Benjamin G. Smith	2 00
Third, Charles B. Travis	1 00
PEACHES.— Crawford's Late, Francis Blake	3 00
Second, Samuel Hartwell	2 00
Third, Mrs. Mary T. Goddard	1 00
Any other variety, W. D. Hinds	3 00
Second, Sumner Coolidge	2 00
Third, Warren Heustis & Son	1 00
PEACHES, ORCHARD HOUSE CULTURE, D. B. Fearing, Newport, R. I.	4 00
PLUMS.— Coe's Golden Drop, Mrs. Mary T. Goddard	2 00
Any other variety, George V. Fletcher	2 00
NATIVE GRAPES.— Brighton, Benjamin G. Smith	3 00
Second, Marshall W. Chadbourne	2 00
Third, Mrs. Mary T. Goddard	1 00
Delaware, Joseph S. Chase	3 00
Second, Warren Fenno	2 00
Third, Benjamin G. Smith	1 00
Herbert, Joseph S. Chase	3 00
Third, Samuel G. Damon	1 00
Iona, Joseph S. Chase	3 00
Second, Samuel G. Damon	2 00
Third, Benjamin G. Smith	1 00
Lindley, Joseph S. Chase	3 00
Second, Benjamin G. Smith	2 00
Niagara, Thomas H. Talbot	3 00
Second, Benjamin G. Smith	2 00
Third, George W. Jameson	1 00
Pocklington, Samuel H. Warren	3 00
Second, M. Houghton	2 00
Third, P. G. Hanson	1 00
Prentiss, Benjamin G. Smith	3 00
Second, Joseph S. Chase	2 00
Third, Samuel G. Damon	1 00
Wilder, Benjamin, G. Smith	3 00
Worden, F. J. Kinney	3 00
Second, Benjamin G. Smith	2 00
Third, William C. Winter	1 00
Any other variety, Benjamin G. Smith	3 00
Second, Benjamin G. Smith	2 00
Third, Mrs. Mary Haller	1 00

N GRAPES.— Four varieties, two bunches of each, Mrs. J. W. Clark, Pomfret, Conn.,	10 00
cond, Benjamin G. Smith	8 00
k Hamburg, two bunches, Mrs. J. W. Clark	5 00
at of Alexandria, Joseph H. White	5 00
other variety, Mrs. J. W. Clark	5 00
cond, Elisha S. Converse	4 00
RRIES.— Half-peck, L. J. Fosdick	3 00
cond, L. J. Fosdick	2 00
ird, " "	1 00
atuities : —	
W. Clark, Collection of Grapes	3 00
S. Chase, " " "	1 00
Hinds, " " Peaches	2 00

BITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 16.

Benjamin V. French Fund.

.— Baldwin, Joshua C. Stone	5 00
ardston, Samuel Hartwell	5 00

Society's Prizes.

.— Baldwin, Samuel G. Damon	3 00
cond, Joshua C. Stone	2 00
ird, J. V. Fletcher	1 00
her Russet, Amos T. Leavitt	3 00
ardston, John Parker	3 00
cond, Joshua C. Stone	2 00
ird, Samuel Hartwell	1 00
Russet, Samuel Hartwell	3 00
cond, Dr. Walter G. Kendall	2 00
ern Spy, George V. Fletcher	3 00
cond, Samuel Hartwell	2 00
ird, William T. Hall	1 00
e Island Greening, George V. Fletcher	3 00
cond, Joshua C. Stone	2 00
ird, Samuel Hartwell	1 00
ury Russet, Frank M. Stone	3 00
cond, Luther Woodbury	2 00
ird, Joshua C. Stone	1 00

Any other variety, Samuel Hartwell, Mackintosh	3 00
Second, George V. Fletcher, Pound Sweet	2 00
Third, Samuel Hartwell, Gloria Mundi	1 00
PEARS.— Angouleme, A. T. Brown	4 00
Second, Samuel G. Damon	3 00
Third, Mary Curtis	2 00
Fourth, Varnum Frost	1 00
Anjou, A. T. Brown	4 00
Second, Samuel G. Damon	3 00
Third, Mrs. S. Klaus	2 00
Fourth, Charles E. Swain	1 00
Clairgeau, Samuel G. Damon	3 00
Second, William T. Hall	2 00
Third, Joshua C. Stone	1 00
Comice, A. T. Brown	4 00
Second, William Everett	3 00
Third, S. F. & F. L. Weston	2 00
Fourth, Samuel G. Damon	1 00
Dana's Hovey, A. T. Brown	4 00
Second, Samuel G. Damon	3 00
Third, Charles E. Swain	2 00
Fourth, George V. Fletcher	1 00
Diel, Samuel G. Damon	3 00
Second, A. T. Brown	2 00
Third, Charles E. Swain	1 00
Glout Morceau, Mary Curtis	3 00
Second, Warren Fenno	2 00
Third, Clifford Weld	1 00
Josephine of Malines, Samuel G. Damon	3 00
Second, Warren Fenno	2 00
Third, John L. Bird	1 00
Langelier, Thomas M. Davis	3 00
Second, A. T. Brown	2 00
Third, Mrs. S. Klaus	1 00
Lawrence, A. T. Brown	3 00
Second, Mrs. Emmons	2 00
Third, Mrs. A. A. Johnson	1 00
Vicar, A. T. Brown	3 00
Second, John J. Merrill	2 00
Third, Elisha S. Converse	1 00
Winter Nelis, Thomas M. Davis	3 00
Second, A. T. Brown	2 00
Third, Mrs. Emmons	1 00
Any other variety, Samuel G. Damon, Sheldon	3 00
Second, A. T. Brown, Bosc	2 00
Third, Charles E. Swain, Seckel	1 00

IGN GRAPES.— Two bunches of any variety, Elisha S. Converse, Gros Colman 4 00
econd, Elisha S. Converse, Alicante 3 00

Gratuities: —

el G. Damon, Collection of Pears 5 00
Fosdick, Cranberries 2 00

SOCIETY'S SILVER MEDAL.

mber 3. Mrs. J. W. Clark, Pomfret, Conn., Golden Hamburg Grapes.

FIRST CLASS CERTIFICATE OF MERIT.

al Exhibition of Fruits and Vegetables, October 2 and 3. Ward D. Gunn, Cliftondale, N.Y., Alice Grapes.

REPORT

OF THE

COMMITTEE ON VEGETABLES,

FOR THE YEAR 1895.

By CHARLES N. BRACKETT, CHAIRMAN.

The exhibitions of vegetables during the past year, taking the season as a whole, have been of unusual excellence. For beauty, evenness, and smoothness of growth, it was the generally expressed opinion that the specimens shown have rarely if ever been excelled at any of our former exhibitions.

Competition for the prizes has been more active and close than in any former year within the memory of the present Committee. There has also been a large increase in the number of contributors.

On nearly every Saturday from January to November, whether it has been prize day or not, choice specimens of vegetables either from the forcing house or open ground have been on exhibition, thereby adding to the interest in our weekly shows.

The constant and increasing interest manifested by contributors and the public generally, in this department of our exhibitions, has been duly appreciated by your Committee, and should be highly gratifying to the Society at large.

The opening Prize Exhibition of the year was that for Forced Vegetables, January 12, at which time there were shown specimens of Rhubarb, Radishes, Cucumbers, Lettuce, Mushrooms, Parsley and Tomatoes, all of which were of superior quality and growth.

From this time to the Annual Exhibition our weekly shows have been such as not only to attract and gratify visitors, but also to

ct credit upon contributors and the Society. From year ear marks of improvement are visible, and give evidence of a tantly growing and continued progress on the part of the vator.

n May 4, the first Asparagus of the season was shown by um Frost, who secured the first prize. Fine specimens were exhibited on the following prize day by P. G. Hanson and . George Heywood, who were awarded prizes in the order ed.

eas were shown for the first time June 15, F. C. Goddard g the exhibitor. From this date on through the season peas shown in liberal quantity and variety. The leading kinds American Wonder, Advancer, Stratagem, Heroine, and npion. A new and very handsome pea belonging to the same as the Heroine and Stratagem was shown by Samuel J. Tre-, and was much admired. It was called Juno.

ith many growers the Heroine is taking the place of the tagem on account of the difficulty of procuring pure seed of variety, which of late appears to be badly mixed and unreli-. It is to be regretted that so fine a pea should be allowed to out for want of care in the selection and growing of stock seed.

omatoes of outdoor culture were shown for the first time July Joshua C. Stone being awarded the first prize for the Boston ket. Fine specimens of May's Favorite and Paragon were n on the same date.

he cultivation and development of the different varieties of the ato may be said to have approached, if not to have reached, ection. In form, quality, or size there appears to be little to esired. If any further improvement is possible it would seem e in the way of earliness, but we doubt whether much more be gained in that direction. The experience of the past ten or e years shows that we have about reached the limit.

new feature, and one in which the visiting public appears to eeply interested at the present time, has been the introduction ur weekly shows of large collections of our Native Mushrooms, edible and noxious. The larger portion of the Mushroom ly are said to be wholesome and nutritious, but because of prevailing ignorance in regard to them, deaths from eating e which are poisonous are of not infrequent occurrence, so great care and experience are requisite to discriminate those

which can be eaten with safety. It is useless to tell an ignorant person how to distinguish a poisonous from a wholesome mushroom. This knowledge can be safely gained only by learning from those who know. Until such knowledge is acquired we can only advise the masses to eat nothing but the one which everybody is supposed to have learned to be the good Mushroom, *(Agaricus campestris)* and the only one which is generally grown artificially.

The largest exhibition of Native Mushrooms was made at the weekly show, July 27. The contributors were Hollis Webster, Annie M. Livsey of Crompton, R. I., Joseph H. Woodford, and William C. Bates. The collection of Mr. Webster was a very extensive one, comprising a large number of named specimens both edible and noxious. On August 10, Charles E. Richardson showed a good collection, and Ellen N. Rumrill another October 19.

In view of the interest manifested both by members of the Society and visitors, in acquiring a better knowledge of our Native Mushrooms, it has been thought advisable to offer prizes the coming year for the best collection of named Edible Native Mushrooms. For further information those interested are referred to the Schedule of Prizes for 1896.

At the Annual Exhibition were to be seen a fine collection of vegetables of all the best varieties, giving proof of the highest cultivation, and displayed in tempting profusion.

The show of Potatoes at this time was the largest and best the Society has ever made. There were one hundred and six dishes in all and not a really poor one among the lot. The first prize for the best four varieties was awarded to C. H. Thomas of New Hampshire. His specimens were splendidly grown and much admired.

The show of Tomatoes at this exhibition was equally fine and full,—one of the best ever made so late in the season. The whole number of dishes was eighty-seven. Hon. Aaron Low was the largest contributor, showing some twenty varieties. The first prize for the best three varieties was awarded to Varnum Frost.

At this exhibition we were indebted to William J. Martin, gardener to Nathaniel T. Kidder, for a large collection comprising upwards of sixty varieties of well-grown vegetables, tastefully arranged and forming an interesting feature of the show.

The show of Cauliflowers, Celery, and Squashes was also unusually fine, the exhibits of Cauliflowers by A. M. Knowlton, William H. Teele, and B. J. Souza, and of Celery by Warren Heustis & Son and Arthur F. Coolidge being particularly worthy of mention.

During the past exhibition season more of the prizes offered in the Schedule have been competed for and taken than in any previous year, the full amount appropriated for Vegetables having been awarded.

The attention of contributors is called to changes and alterations in the Schedule of Prizes for the coming year.

All of which is respectfully submitted,

For the Committee,

C. N. BRACKETT,

Chairman.

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

JANUARY 5.

Gratuities:—

Francis Brown Hayes, Celery	$1 00
Norris Comley, Rhubarb	1 00

JANUARY 12.

RADISHES. — Four bunches of any variety, Joshua C. Stone	3 00
Second, Warren Heustis & Son	2 00
Third, Charles A. Learned	1 00
CUCUMBERS.— Pair of any variety, John L. Gardner	3 00
LETTUCE.— Four heads of Tennisball, H. R. Kinney	2 00
Second, W. N. Craig	1 00
PARSLEY.— Two quarts, H. R. Kinney	3 00
Second, W. N. Craig, Matchless	2 00
Third, W. N. Craig, Emerald	1 00
MUSHROOMS.— Twenty-four specimens, George M. Anderson	3 00
TOMATOES.— Twelve specimens, Winter Brothers, Essex	3 00
Second, W. N. Craig, Chemin	2 00
Third, Winter Brothers, President Cleveland	1 00

Gratuities:—

Warren Heustis & Son, Celery	2 00
Francis Brown Hayes, "	1 00
Norris Comley, Rhubarb	1 00

JANUARY 19.

Gratuity:—

Norris Comley, Rhubarb	1 00

FEBRUARY 2.

RADISHES.— Four bunches of any variety, Joshua C. Stone	3 00
Third, W. N. Craig	1 00
CUCUMBERS.— Pair of any variety, John L. Gardner	3 00
LETTUCE.— Four heads of Tennisball, the Second prize to Joshua C. Stone	3 00
RHUBARB.— Twelve stalks, Norris Comley	3 00
Second, C. F. Smith	2 00
Third, George Sanderson	1 00
TOMATOES.— Twelve specimens, Winter Brothers, Chemin	3 00
Second, W. N. Craig	2 00
Third, Winter Brothers, Essex	1 00

atuities : —

Heustis & Son, Celery 1 00
n Miller, Mushrooms 1 00

FEBRUARY 16.

atuity : —

Heustis & Son, Celery 1 00

FEBRUARY 23.

atuities : —

Heustis & Son, Celery 1 00
F. Calder, Rhubarb 1 00
A. Learned, Lettuce 1 00

MARCH 2.

atuity : —

Heustis & Son, Celery 1 00

MARCH 9.

atuities : —

Nevins, Cauliflowers 1 00
J. Trepess, Lettuce 1 00

MARCH 16.

atuity : —

yons, Lettuce 1 00

SPRING EXHIBITION.

MARCH 26, 27, 28, AND 29.

William J. Walker Fund.

ES.— Four bunches of Turnip Rooted, H. R. Kinney . . 3 00
cond, Joshua C. Stone 2 00
bunches of Long Scarlet, H. R. Kinney 3 00
cond, William C. Winter 2 00
ird, John L. Bird 1 00
.— Four roots, Warren Heustis & Son, Perle le Grand . 3 00
cond, Warren Heustis & Son, Boston Market . . . 2 00
CE.— Four heads of Tennisball, H. R. Kinney . . . 3 00
cond, Charles A. Learned 2 00
ird, Nathaniel T. Kidder 1 00
EY.— Two quarts, H. R. Kinney 2 00
cond, George Sanderson 1 00
OOMS.— Twenty-four specimens, Mrs. E. M. Gill . . . 3 00

Rhubarb.— Twelve stalks, Norris Comley	3 00
Second, George Sanderson	2 00
Tomatoes.— Twelve specimens, Winter Brothers, Chemin	3 00
Second, Winter Brothers, Essex	2 00

Gratuities : —

David Nevins, Celery	1 00
" " Mushrooms	1 00
" " Cauliflowers	1 00
John L. Gardner, Cucumbers	1 00
Charles A. Learned, Beets	1 00
Warren Heustis & Son, Collection	1 00

April 6.

Cucumbers.— Pair of White Spine, Charles Cummings	3 00
Mushrooms.— Twenty-four specimens, the Second prize to Mrs. E. M. Gill	2 00

Gratuity : —

Warren Heustis & Son, Radishes	1 00

April 13.

Gratuity : —

Warren Heustis & Son, Radishes	1 00

April 20.

Gratuity : —

Warren Heustis & Son, Dandelions	1 00

MAY EXHIBITION.

May 4.

Asparagus.— Four bunches, Varnum Frost	3 00
Cucumbers.— Pair of White Spine, Varnum Frost	3 00
Second, Walter Russell	2 00
Third, Charles Cummings	1 00
Any other variety, the Third prize to John L. Gardner	1 00
Spinach.— Peck, Warren Heustis & Son	3 00
Dandelions.— Peck, Varnum Frost	2 00
Second, Warren Heustis & Son	1 00
Lettuce.— Four heads, John L. Gardner	3 00
Rhubarb.— Twelve stalks, Varnum Frost	3 00
Second, P. G. Hanson	2 00
Third, Warren Heustis & Son	1 00

atuities : —

n Frost, Cucumbers	1 00
. Gardner, Lettuce	1 00
Craig, Tomatoes and Parsley	3 00
Russell, Radishes	1 00
n Heustis & Son, Radishes	1 00
Iary T. Goddard, Collection	2 00

MAY 11.

atuities : —

Hanson, Asparagus and Rhubarb	2 00
eorge Heywood, Asparagus	1 00
Russell, Cucumbers and Radishes	1 00
n Heustis & Son, Collection	2 00

MAY 18.

atuities : —

Iary T. Goddard, Beets and Carrots	2 00
n Heustis & Son, Radishes	1 00
eorge Heywood, Asparagus	1 00
Craig, Collection of Tomatoes, etc.	3 00
Russell, Collection	2 00

MAY 25.

atuities : —

Craig, Cucumbers and Tomatoes	2 00
. Gardner, Cabbages and Cucumbers	2 00
Heywood, Asparagus	1 00
n Heustis & Son, Collection	3 00
Russell, "	3 00

JUNE 1.

atuities : —

. Gardner, Cauliflowers	1 00
n Heustis & Son, Collection	2 00
Hanson, "	2 00
Russell, "	1 00

RHODODENDRON SHOW.

JUNE 6 AND 7.

.— Twelve specimens, Mrs. Mary T. Goddard	3 00
econd, Joshua C. Stone	2 00
rs.— Twelve Short Scarlet, W. N. Craig	3 00
econd, Warren Heustis & Son	2 00
hird, Mrs. Mary T. Goddard	1 00

RADISHES.— Four bunches of Turnip Rooted, Walter Russell	3 00
Second, Warren Heustis & Son	2 00
Third, Walter Russell	1 00
Four bunches of Long Scarlet, Warren Heustis & Son	3 00
ASPARAGUS.— Four bunches, P. G. Hanson	3 00
Second, Hon. George Heywood	2 00
Third, J. Fuller	1 00
CUCUMBERS.— Pair, grown under glass, Warren Heustis & Son	3 00
Second, Charles Cummings	2 00
Third, Walter Russell	1 00
LETTUCE.— Four heads, Joshua C. Stone	3 00
Second, Sumner Coolidge	2 00
Third, George Winn	1 00
RHUBARB.— Twelve stalks, P. G. Hanson	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, Samuel J. Trepess	1 00
TOMATOES.— Twelve specimens, W. N. Craig	3 00
Second, Moses Stevens, Nicholson's Hybrid	2 00
Third, " " May's Favorite	1 00

Gratuities: —

Warren Heustis & Son, Collection	3 00
John L. Gardner, "	3 00
W. N. Craig, "	2 00
Walter Russell, "	2 00
H. R. Kinney, "	2 00

JUNE 15.

Gratuities: —

John L. Gardner, Cauliflowers and Peas	2 00
F. E. Goddard, Stratagem Peas	1 00
Hon. Joseph S. Fay, Collection	4 00
Walter Russell, "	3 00
Warren Heustis & Son, "	3 00

ROSE AND STRAWBERRY SHOW.

JUNE 20 AND 21.

BEETS.— Twelve Summer Turnip Rooted, Warren Heustis & Son	$3 00
Second, Sumner Coolidge	2 00
Third, Joshua C. Stone	1 00
ONIONS.— Twelve specimens, Walter Russell	3 00
Second, Sumner Coolidge	2 00
Third, Warren Heustis & Son	1 00

MBERS.— Pair of White Spine, Warren Heustis & Son	3 00
Second, Charles A. Learned	2 00
Third, Walter Russell	1 00
y other variety, W. N. Craig	3 00
AGES.— Three of any variety, trimmed, Hon. Joseph S. Fay	3 00
Third, Warren Heustis & Son	1 00
UCE.— Four heads of any variety, Sumner Coolidge	3 00
Second, Warren Heustis & Son	2 00
Third, E. C. Lewis	1 00
.— Half-peck of any variety, P. G. Hanson	3 00
Second, Hon. Joseph S. Fay	2 00
Third, Charles A. Learned	1 00

Gratuities :—

Joseph S. Fay, Cauliflowers	1 00
. Craig, Collection of Tomatoes	2 00
er Brothers " "	1 00
ier Coolidge, Collection	2 00
Hanson, "	1 00
en Heustis & Son, Collection	1 00

JUNE 29.

TOES.— Twelve specimens, Hon. Joseph S. Fay, Hebron	3 00
Second, Hon. Joseph S. Fay, New Queen	2 00
Third, Hon. Joseph S. Fay, Early Rose	1 00
ns.— Twelve specimens, Sumner Coolidge	2 00
Second, Hon. Joseph S. Fay	1 00
SHES.— Four Long Warted, Joshua C. Stone	2 00
Second, Sumner Coolidge	1 00
ar Scalloped, Sumner Coolidge	2 00
Second, Joshua C. Stone	1 00
AGES.— Three of any variety, trimmed, Hon. Joseph S. Fay, Wakefield	3 00
Second, Hon. Joseph S. Fay, Wyman	2 00
Third, Warren Heustis & Son, All Seasons	1 00
— Half-peck of American Wonder, Hon. Joseph S. Fay	3 00
y other variety, Isaac E. Coburn, Advance	3 00
Second, Hon. Joseph S. Fay	2 00
Third, Joshua C. Stone	1 00

Gratuities :—

P. Spaulding, Beans	1 00
en Heustis & Son, Collection	2 00
ier Coolidge, "	2 00
er Russell "	1 00

JULY 6.

SQUASHES.— Four Long Warted, Sumner Coolidge	2 00
Second, Walter Russell	1 00
BEANS.— Half-peck of String, of any variety, Joshua C. Stone, Cranberry	3 00
Second, Warren Heustis & Son, Cranberry	2 00
Third, Sumner Coolidge, Hybrid	1 00
PEAS.— Half-peck of Stratagem, John P. Spaulding	3 00
Half-peck of any other variety, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00

Gratuities: —

W. N. Craig, Tomatoes	2 00
Moses Stevens, "	1 00
Samuel J. Trepess, Tomatoes	1 00
Warren Heustis & Son, Collection	2 00
Sumner Coolidge, "	2 00
Walter Russell, "	1 00

JULY 13.

CABBAGES.— Three Drumhead, trimmed, Warren Heustis & Son, All Seasons	3 00
Second, Warren Heustis & Son, Johnson's No. 2	2 00
BEANS.— Half-peck of Cranberry, Joshua C. Stone	3 00
Second, Warren Heustis & Son	2 00
Third, Sumner Coolidge	1 00
PEAS.— Half-peck of any variety, Isaac E. Coburn, Heroine	3 00
Second, Samuel J. Trepess, Juno	2 00
Third, Isaac E. Coburn, Advancer	1 00
SWEET CORN.— Twelve ears, Sumner Coolidge, Hybrid	3 00
Second, Sumner Coolidge, Corey	2 00
Third, Joshua C. Stone, "	1 00
TOMATOES.— Open culture, twelve specimens, Joshua C. Stone, Boston Market	3 00
Second, Samuel J. Trepess, Paragon	2 00
Third, Samuel J. Trepess, May's Favorite	1 00

Gratuities: —

Walter Russell, Cucumbers	1 00
Sumner Coolidge, Collection	3 00
Warren Heustis & Son, "	2 00
W. N. Craig, "	1 00

JULY 20.

POTATOES.— Twelve specimens, Hon. Joseph S. Fay, Rose,	3 00
Second, Hon. Joseph S. Fay, Hebron	2 00
Third, Hon. Joseph S. Fay, Savoy	1 00

CE.— Four heads of any variety, Warren Heustis & Son	3 00
econd, Sumner Coolidge	2 00
hird, George F. Stone	1 00
r CORN.— Twelve ears, Sumner Coolidge, Hybrid	3 00
econd, Sumner Coolidge, Corey	2 00
hird, Joshua C. Stone, "	1 00
ROES.— Open culture, twelve specimens, Joshua C. Stone, Boston Market	3 00
econd, Samuel J. Trepess, Acme	2 00
hird, W. N. Craig	1 00
ratuities : —	
r Russell, Cucumbers	1 00
Sprague, Celery	2 00
niel T. Kidder, Tomatoes	1 00
Joseph S. Fay, Collection of Potatoes	1 00
n Heustis & Son, Collection	2 00
er Coolidge, "	2 00

JULY 27.

ONS.— Any variety, twelve specimens, Hon. Joseph S. Fay, Rose	3 00
econd, Hon. Joseph S. Fay, Hebron	2 00
hird, Isaac E. Coburn, "	1 00
NES.— Three Marrow, Joshua C. Stone	3 00
econd, Sumner Coolidge	2 00
— Half-peck of any variety, C. H. Goddard, Stratagem	3 00
econd, Isaac E. Coburn, Heroine	2 00
hird, Hon. Aaron Low, Stratagem	1 00
CORN.— Twelve ears of Crosby, Sumner Coolidge	3 00
econd, Joshua C. Stone	2 00
lve ears of any other variety, Sumner Coolidge, Hybrid	3 00
econd, Joshua C. Stone, Hybrid	2 00
hird, Joshua C. Stone, Corey	1 00
ROES.— Twelve specimens, Joshua C. Stone, Comrade	3 00
econd, Winter Brothers, President Cleveland	2 00
hird, Isaac E. Coburn, Comrade	1 00
ratuities : —	
n Heustis & Son, Cabbages	1 00
er Coolidge, Collection	2 00
Lewis, "	2 00
Craig, "	1 00
E. Coburn, "	1 00
r Russell, "	1 00
Webster, " of Fungi	5 00
n H. Woodford, " " "	3 00
M. Livsey, " " "	2 00
m C. Bates, " " "	2 00

AUGUST 3.

BEANS.— Two quarts of Goddard, shelled, Rev. Calvin Terry	3 00
Half-peck of Horticultural, Joshua C. Stone	3 00
Second, Sumner Coolidge	2 00
Third, Sumner Coolidge, King	1 00
TOMATOES.— Twelve specimens of Acme, Samuel J. Trepess	3 00
Twelve specimens of Comrade, Isaac E. Coburn	3 00
Second, Joshua C. Stone	2 00
Twelve specimens of any other variety, Isaac E. Coburn, Stone	3 00
Second, E. N. Pierce, Lorillard	2 00
Third, Isaac E. Coburn, Atlantic Prize	1 00
EGG PLANT.— Four specimens of Round Purple, Joshua C. Stone	3 00
Second, Sumner Coolidge	2 00

Gratuities: —

Joshua C. Stone, Egg Plants	1 00
Hon. John P. Spaulding, Cauliflower	1 00
C. H. Goddard, Stratagem Peas	1 00
W. N. Craig, Collection	2 00
Sumner Coolidge, "	1 00
Warren Heustis & Son, Collection	1 00

AUGUST 10.

SWEET CORN.— Twelve ears, Sumner Coolidge, Potter's Excelsior	3 00
Second, Oliver R. Robbins, Honey Dew	2 00
Third, Sumner Coolidge, Fottler's Early	1 00
EGG PLANT.— Four specimens of Round Purple, Sumner Coolidge	2 00
Second, Joshua C. Stone	1 00

Gratuities: —

Samuel J. Trepess, Tomatoes	1 00
James Comley, Cucumbers	1 00
Warren Heustis & Son, Collection	2 00
Sumner Coolidge, "	1 00
Charles E. Richardson, Fungi	2 00
William C. Bates, "	1 00

AUGUST 17.

POTATOES.— Twelve specimens of any variety, Hon. Joseph S. Fay, Hebron	3 00
Second, Samuel Hartwell, Hebron	2 00
Third, Isaac E. Coburn, Rose	1 00
ONIONS.— Twelve specimens, W. N. Craig	3 00
Second, Sumner Coolidge	2 00
Third, Warren Heustis & Son	1 00

LESH MELONS.— Four specimens, Isaac E. Coburn	3 00
ond, Samuel Hartwell	2 00
rd, C. L. Marshall	1 00
— Two quarts of Large Lima, Sumner Coolidge	3 00
ond, Hon. John P. Spaulding	2 00
uarts of Goddard, Oliver R. Robbins	3 00
ond, Rev. Calvin Terry	2 00
rd, Samuel Hartwell	1 00
CORN.— Twelve ears of Potter's Excelsior, Mrs. Mary T. Goddard	3 00
ond, Charles B. Lancaster	2 00
rd, Hon. Aaron Low	1 00
e ears of any other variety, Sumner Coolidge, Stowell's	3 00
ond, Hon. Joseph S. Fay, Stowell's	2 00
rd, Oliver R. Robbins, Honey Dew	1 00
.—Twelve specimens of Squash, P. G. Hanson	3 00
ond, Joshua C. Stone.	2 00
rd, E. C. Lewis	1 00
ther variety, Nathaniel T. Kidder, Ruby King	3 00
ond, E. C. Lewis, " "	2 00
rd, Hon. Joseph S. Fay, " "	1 00
—Four roots of any variety, Warren Heustis & Son	3 00
ond, Varnum Frost	2 00
rd, W. N. Craig	1 00

tuities: —

Russell, Collection	3 00
Craig, "	3 00
ewis, "	3 00
el T. Kidder, "	2 00

AUGUST 24.

ES.—Three of any variety, trimmed, Joshua C. Stone	3 00
LOWERS.—Four specimens, A. M. Knowlton	3 00
.—Four roots, Varnum Frost	3 00
cond, Warren Heustis & Son	2 00
—Two quarts of Large Lima, Sumner Coolidge	3 00
quarts of Dwarf Lima, Hon. John P. Spaulding	3 00
cond, Isaac E. Coburn	2 00
NIAS.—Twelve specimens, Marshall W. Chadbourne	2 00
cond, Nathaniel T. Kidder	1 00
s.—Twelve specimens of Squash, P. G. Hanson	3 00
cond, George W. Jameson	2 00
ird, Joshua C. Stone,	1 00
other variety, Nathaniel T. Kidder, Ruby King	3 00

Gratuities : —

Isaac E. Coburn, Collection of six varieties of Tomatoes.	3 00
Varnum Frost, Tomatoes	1 00
W. N. Craig, Collection	3 00
A. S. Coffin, Collection of Fungi	2 00
William C. Bates " "	1 00

SEPTEMBER 7.

Gratuity : —

Warren Heustis & Son, Celery	2 00

SEPTEMBER 14.

GREENFLESH MELONS.—Four specimens, E. C. Lewis	3 00
Second, Sumner Coolidge,	2 00
Third, Warren Heustis & Son,	1 00
SALMON FLESH MELONS.—Four specimens, Hon. Aaron Low	3 00
Second, Hon. Aaron Low, Christiana	2 00
Third, Hon. Aaron Low, Emerald Gem	1 00
WATERMELONS.—Two specimens, Rev. Calvin Terry	3 00
Second, Sumner Coolidge, Phinney's	2 00
Third, Sumner Coolidge, Ferry's Hybrid	1 00
CAULIFLOWERS.—Four specimens, A. M. Knowlton	3 00
Second, B. J. De Souza	2 00
Third, Joshua C. Stone	1 00
LETTUCE.—Four heads of any variety, E. C. Lewis, Defiance	3 00
Second, Sumner Coolidge	2 00
Third, E. C. Lewis, Sutton's Favorite	1 00
CELERY.—Four roots of any variety, Arthur F. Coolidge	3 00
Second, Warren Heustis & Son	2 00
PARSLEY.—Two quarts, Sumner Coolidge	2 00
Second, Mrs. Mary T. Goddard	1 00
BEANS.—Two quarts of Large Lima, Varnum Frost	3 00
Second, Sumner Coolidge	2 00
Third, Mrs. Mary T. Goddard	1 00
CORN, SWEET.—Twelve ears of Potter's Excelsior, Charles B. Lancaster	3 00
Second, Sumner Coolidge,	2 00
Third, P. G. Hanson	1 00
Any other sweet variety, Oliver R. Robbins, Hickock	3 00
Second, P. G. Hanson, Quincy Market	2 00
Third, Arthur F. Coolidge, Stowell's	1 00
EGG PLANT.—Four Round Purple, Sumner Coolidge	3 00
Second, Arthur F. Coolidge,	2 00
Third, Joshua C. Stone	1 00
TOMATOES.—Three varieties, twelve specimens each, Varnum Frost,	5 00
Second, Hon. Aaron Low	4 00
Third, W. N. Craig	3 00

lve Acme, Hon. Aaron Low	3 00
econd, Samuel J. Trepess	2 00
hird, Mrs. Mary T. Goddard	1 00
lve Comrade, Varnum Frost	3 00
econd, Isaac E. Coburn	2 00
hird, Hon. Aaron Low	1 00
lve Ignotum, Isaac E. Coburn	3 00
econd, Mrs. Mary T. Goddard	2 00
lve May's Favorite, Varnum Frost	3 00
econd, Nathaniel T. Kidder	2 00
hird, Hon. Aaron Low	1 00
lve Paragon, Varnum Frost	3 00
econd, P. G. Hanson	2 00
hird, Samuel J. Trepess	1 00
lve of any other variety, Varnum Frost, Stone	3 00
econd, Isaac E. Coburn, Stone	2 00
hird, P. G. Hanson, Stone	1 00
NIAS.—Twelve specimens, Marshall W. Chadbourne	2 00
econd, Nathaniel T. Kidder	1 00
—Twelve specimens, Nathaniel T. Kidder	3 00
econd, Nathaniel T. Kidder, Dwarf	2 00
hird, Warren Heustis & Son	1 00
ns.—Twelve specimens of Squash, P. G. Hanson	3 00
econd, George W. Jameson	2 00
hird, Joshua C. Stone	1 00
other variety, Nathaniel T. Kidder, Bull Nose	3 00
econd, Hon. Aaron Low, " "	2 00
hird, Nathaniel T. Kidder, Ruby King	1 00

ratuities:

Aaron Low, Collection of ten varieties of Tomatoes	3 00
Lewis, Collection	5 00
Craig, "	3 00
r Russell, "	1 00
Hanson, "	1 00

SEPTEMBER 21.

ratuities:—

n Heustis & Son, Celery	2 00
Tassinari, Onions	1 00
l T. Curtis, Cucumbers	1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

OCTOBER 2 AND 3.

Special Prizes.

CAULIFLOWERS.— Best four specimens, and best kept during the exhibition, William H. Teele 5 00
Second, A. M. Knowlton 4 00
CELERY.— Best four specimens, and kept best during the exhibition, Warren Heustis & Son 8 00
Second, Arthur F. Coolidge 6 00

Regular Prizes.

BEETS.— Twelve Turnip Rooted, Varnum Frost. 3 00
Second, Warren Heustis & Son 2 00
Third, H. R. Kinney 1 00
CARROTS.— Twelve Long Orange, H. R. Kinney . . 3 00
Twelve Intermediate, H. R. Kinney 3 00
Second, Henry E. Rich 2 00
Third, Warren Heustis & Son 1 00
PARSNIPS.— Twelve Long, H. R. Kinney 3 00
Second, E. C. Lewis 2 00
Third, Mrs. J. W. Clark 1 00
POTATOES.— Four varieties, twelve specimens each, C. H. Thomas 5 00
Second, Mrs. Mary T. Goddard 4 00
Third, Isaac E. Coburn 3 00
Clark, Twelve specimens, Samuel Hartwell 3 00
Second, Mrs. Mary T. Goddard 2 00
Third, Isaac E. Coburn 1 00
Hebron, Isaac E. Coburn 3 00
Second, W. F. Wilder 2 00
Third, H. R. Kinney 1 00
Rose, Isaac E. Coburn 3 00
Second, B. J. De Souza 2 00
Third, Mrs. Mary T. Goddard 1 00
Savoy, Samuel Hartwell 3 00
Second, Hon. Aaron Low 2 00
Third, H. R. Kinney 1 00
Any other variety, C. H. Thomas, Rural New Yorker . . 3 00
Second, W. F. Wilder, Monroe County Prize 2 00
Third, H. R. Kinney, Potentate 1 00
SALSIFY.— Twelve specimens, Nathaniel T. Kidder . . . 3 00
Second, E. C. Lewis 2 00
Third, Samuel J. Trepess 1 00

s.— Twelve Flat, F. J. Kinney	2 00
cond, Henry E. Rich	1 00
lish, B. J. De Souza	2 00
cond, H. R. Kinney	1 00
.— Twelve Danvers, Ettore Tassinari	3 00
cond, William O'Connell	2 00
ird, Varnum Frost	1 00
William O'Connell	3 00
cond, W. N. Craig	2 00
ird, Nathaniel T. Kidder	1 00
te, William O'Connell	3 00
cond, Walter Russell	2 00
HES.— Three Bay State, Sumner Coolidge	3 00
cond, Hon. Aaron Low	2 00
ird, Charles B. Lancaster	1 00
bard, Arthur F. Coolidge	3 00
cond, Sumner Coolidge	2 00
ird, E. C. Lewis	1 00
rid Turban, Hon. Aaron Low	3 00
cond, Joshua C. Stone	2 00
ird, E. C. Lewis	1 00
blehead, E. C. Lewis	3 00
row, Sumner Coolidge	3 00
cond, Varnum Frost	2 00
ird, Arthur F. Coolidge	1 00
ELS SPROUTS.— Half-peck, E. C. Lewis	3 00
cond, Richard T. Lombard	2 00
ird, W. N. Craig	1 00
GES.— Three Drumhead, trimmed, Charles B. Lancaster	3 00
cond, Mrs. Mary T. Goddard	2 00
ird, Samuel Hartwell	1 00
, trimmed, Mrs. George S. Harwood	3 00
cond, H. R. Kinney	2 00
ird, Charles B. Lancaster	1 00
oy, trimmed, Joshua C. Stone	3 00
cond, Samuel J. Trepess	2 00
ird, Samuel Hartwell	1 00
FLOWERS.— Four specimens, William H. Teele	3 00
cond, A. M. Knowlton	2 00
ird, B. J. De Souza	1 00
P.— Paris Golden, four roots, best kept, Arthur F. Coolidge	4 00
cond, Warren Heustis & Son	3 00
ird, Varnum Frost	2 00
other variety, H. R. Kinney, Giant Pascal	4 00
cond, Warren Heustis & Son, " "	3 00
ird, Mrs. J. W. Clark, Pomfret, Conn., White Plume	2 00

ENDIVE.— Four specimens, H. R. Kinney 3 00
Second, Sumner Coolidge 2 00
Third, Mrs. Mary Haller 1 00
LETTUCE.— Four heads, Sumner Coolidge 3 00
Second, Warren Heustis & Son 2 00
Third, Joshua C. Stone 1 00
PARSLEY.— Two quarts, Mrs. Mary T. Goddard 3 00
Second, Arthur F. Coolidge 2 00
Third, Sumner Coolidge 1 00
HORSERADISH.— Six Roots, H. R. Kinney 3 00
CORN.— Yellow, or Field, twenty-five ears, traced, William H. Cowen 3 00
Second, William H. Cowen, eight rowed 2 00
Third, Thomas H. Perkins 1 00
EGG PLANT.— Four Round Purple, Arthur F. Coolidge . . . 3 00
Second, Sumner Coolidge 2 00
Third, Mrs. J. W. Clark 1 00
TOMATOES.— Three varieties, twelve specimens each, Varnum Frost 5 00
Second, Hon. Aaron Low 4 00
Third, " " " 3 00
Acme, twelve specimens, Hon. Aaron Low 3 00
Second, Samuel J Trepess 2 00
Third, Henry E. Rich 1 00
Comrade, P. G. Hanson 3 00
Second, Varnum Frost 2 00
Third, Hon. Aaron Low 1 00
May's Favorite, Hon. Aaron Low 3 00
Second, W. N. Craig 2 00
Third, Varnum Frost 1 00
Paragon, P. G. Hanson 3 00
Second, Hon. Aaron Low 2 00
Third, Oliver R. Robbins 1 00
Any other variety, Samuel J. Trepess, Ignotum 3 00
Second, Isaac E. Coburn, Stone 2 00
Third, P. G. Hanson, President Cleveland 1 00
PEPPERS.— Twelve specimens of Squash, P. G. Hanson . . . 3 00
Second, George W. Jameson 2 00
Third, Joshua C. Stone 1 00
Any other variety, George W. Jameson, Ruby King . . . 3 00
Second, Nathaniel T. Kidder, Bull Nose 2 00
Third, Mrs. J. W. Clark, " " 1 00

Gratuities : —

Hon. Aaron Low, Thirteen varieties of Potatoes 3 00
B. C. Lewis, Watermelons 1 00
Samuel Hartwell, Melons 1 00
Henry E. Rich, Beans 1 00

l Hartwell, Lima Beans			1 00
n Heustis & Son, Collection of Celery			3 00
aron Low,	"	" Tomatoes	3 00
E. Coburn,	"	" "	2 00
iel T. Kidder,	"	" Sixty Varieties	10 00
Kinney,	"		4 00
Craig,	"		3 00
ewis,	"		3 00
n Frost,	"		3 00
Russell,	"		3 00
n Heustis & Son,	"		2 00
Tassinari,	"		1 00

OCTOBER 12.

ratuities : —

n Heustis & Son, Celery	1 00
: Melia, Squash	1 00

OCTOBER 19.

ratuities : —

n Heustis & Son, Celery	1 00
I. Rumrill, Native Mushrooms	1 00

NOVEMBER 5.

ratuity : —

M. Anderson, Mushrooms	1 00

IBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 16.

BERS.— Francis Blake, White Spine	3 00
cond, H. R. Kinney, " "	2 00
ird, John L. Gardner, Telegraph	1 00
ES.— Three Red, trimmed, Charles B. Lancaster	3 00
cond, Mrs. Mary T. Goddard	2 00
e Savoy, George Sanderson	3 00
cond, Joshua C. Stone	2 00
LS SPROUTS.— Half-peck, Nathaniel T. Kidder	3 00
cond, W. N. Craig	2 00
LOWERS.—Four specimens, A. M. Knowlton	3 00
cond, William H. Teele	2 00
ird, B. J. De Souza	1 00
.— Four roots, Warren Heustis & Son, Paris Golden	3 00
cond, H. R. Kinney, Paris Golden	2 00
ird, Warren Heustis & Son, Giant Pascal	1 00

LETTUCE.— Four heads, Arthur F. Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, Nathaniel T. Kidder	1 00
TOMATOES.— Twelve specimens, William C. Winter, Chemin	3 00
Second, William C. Winter, Early Essex	2 00
Third, " " " President Cleveland	1 00

Gratuity: —

Francis Blake, Collection	2 00

FIRST CLASS CERTIFICATE OF MERIT.

November 30. A. W. Crockford, for superior cultivation of Mushrooms.

REPORT

OF THE

OMMITTEE ON GARDENS,

FOR THE YEAR 1895.

By JOHN G. BARKER, CHAIRMAN.

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season of 1895 has not differed in many respects from those ave preceded. For the H. H. Hunnewell Triennial Premium lication has been made, but we are glad to report that we have an application for 1896, and another one is confi- expected. For the best arranged and best kept Flower n, named Hardy Perennial and Biennial Plants admissible, gh we should naturally think that this prize would draw on from those who have flower gardens, in many years not han one application has been received. No application was d for the Rose House. Some changes have been made in chedule, which we trust may attract the attention of the s growers.

find it impossible to arrange a Schedule that will include all e should like to offer prizes for. But this fact need not anyone from calling the attention of the Committee to any he may have worthy of inspection.

ing the season of 1895 we have made nine visits, and we hat the account presented of each one will be sufficient ce to the Society of the continued usefulness of the Garden ittee.

Mr. S. C. Pratt's Strawberry Garden, Reading.

Mr. Pratt having made his entry for the best Fruit Garden, the Committee made their visit on the 18th of June. We found that he devoted about fifteen acres to the cultivation of Strawberries, and we were informed that his business is more for the sale of plants than fruit. A complete system of irrigation is in use, which of course is indispensable. About one ton of fertilizer is used to each acre, the chemicals being obtained from a reliable source, Mr. Pratt doing his own mixing, using 1,500 pounds of dissolved Bone Black and 500 pounds of high-grade Sulphate of Potash, costing about $22. A bed is fruited but one season, and first-class fruit is obtained. Mr. Pratt says that his experience with fruiting an old bed has not been satisfactory; the berries are second class and give the grower a poor reputation.

The first fruit picked for the market was June 15, from Beder Wood; the last picking was on the 10th of July, from Beverly, Timbrell, and Fountain. Two acres were fruited that were grown in the narrow row system, for fruit only, Beverly and Barton's Eclipse yielding 20,000 baskets of first-class fruit. Mr. Pratt says: "I am satisfied that with such a yield it pays to raise the fruit at six cents a quart," and that he received twice that at wholesale.

J. W. Manning's Herbaceous Garden, Reading.

On the same day the Committee enjoyed a very profitable visit at the grounds of Mr. Manning, especially in looking over the collection of Herbaceous Plants and some new shrubs of merit. Those who are attendants at the weekly exhibitions have admired and profited by the exhibits of Mr. Manning, and we desire to record our satisfaction at the care bestowed upon his plants, not only in cultivation but in keeping them true to name. No garden is complete today without the hardy bed, for there is nothing that the landscape gardener can use that will give greater satisfaction.

Mr. Manning writes us as follows:

Reading, Mass., Jan. 21, 1896.

Mr. John G. Barker, Chairman of Committee on Gardens:

Dear Sir:— Agreeably to your request I take pleasure in giving you some notes upon the Hardy Perennials and other plants that your Committee viewed at the Reading Nursery last September.

Reading we labor under considerable difficulty in the matter
il, which is quite generally a very light loam, devoid of any
s of clay, but with an excessive preponderance of gravel at
; consequently in many cases we find it quite out of the
ion to attempt the raising of certain classes of nursery stock
n are better grown on a clay soil. For this reason large
s of Pears, Plums, and Cherries are not to be seen with us.
ne other hand for the raising of many sorts of Hardy Herba-
s plants and most of the Shrubs, our soil is exceptionally well
ted.

nong new Hardy Shrubs we find the following of the greatest
ise and worthy of extended culture:

ephanandra flexuosa, of Japanese origin, forms a densely
ched shrub with deeply toothed foliage, of a rich glossy green,
g on unusual tints of reddish purple in its young growth and
n at its autumn ripening. The branches are long and slender,
ely clothed with branchlets, and the white flowers, though
te, are borne in such profusion as to give considerable effect.
ant that clothes itself well to the ground even with age,— a
re of itself.

ubus deliciosus, the Rocky Mountain Bramble, is very hardy
us and of neat habit of growth, with foliage of a pleasing
green, and a wealth of rich white flowers in June and July;
an inch and a half across, giving the effect of single roses.

aryopteris Mastacanthus, the so-called Blue Spiraea, is prov-
of great interest, with its dense whorls of rich deep blue
ers in late September, continuing till frost. Much after the
t of the Desmodium, this probably will kill back nearly if
quite to the ground yearly, but will not kill out completely
ss present indications and reports are decidedly wrong. We
indebted to China for this acquisition.

Hypericum Moserianum, with its rich foliage and elegant large
len flowers in great profusion, is of highest merit but the
ter of a good winter covering of leaves must not be overlooked.

ouble Lilacs and the new single forms, of which there is such
nfusing variety, at present show remarkable improvements,
cannot fail to add greatly to our early summer shrubbery
cts. I note among the best the following:

hilemon.— Rich wine red; perhaps the deepest colored of all
single or double sorts.

Comte Horace de Choiseul.— Double, deep reddish purple.

Chinensis alba.— A dwarf form, with pure white starry flowers with distinct lilac eye.

Trainoniana.— Rich blue; very prolific.

Louis Spaeth.— Deepest reddish purple.

Spiraea arguta.— A new Japanese species, among the earliest and best of new Spiraeas.

Daphne Genkwa.— A deciduous species from Japan, with dense clusters of small intensely fragrant, lilac flowers. It can be highly recommended.

Berberis ilicifolia, the Holly-leaved Barberry is a stronger grower than the Mahonia; not quite so evergreen but with a rich purple shading of foliage in the younger growth and a deep clear green with age. Seemingly quite hardy, this gives great promise.

Colutea purpurea is a notable improvement in flower over the old form of the Bladder Senna; more prolific and richly colored.

Viburnum tomentosum cannot be too highly recommended as a large growing shrub. Its great profusion of showy flat cymes of pure white flowers are well set off by its rich foliage.

Among the newer variegated foliaged shrubs, *Cornus alba* var. *Spaeth*, with rich shading of green and gold; the Golden Hop Tree *(Ptelea trifoliata* var. *aurea);* the Variegated Syringa or Mock Orange, with handsome marbling of silver and green; and the Variegated *Hypericum Moserianum*, with shades of green, gold, and flesh color, are all notably good additions.

In trees the most remarkable good new things that we have tested are the Van Houtte's Golden Elm, with beautiful golden foliage having a charming metallic luster in the full sun, and Dampier's Golden Elm, nearly if not quite as good,— both varieties of the English Elm; the Weeping Purple Beech, a grand thing with good weeping tendencies and a particularly rich purple coloring of foliage; the Tricolor Beech, having the foliage handsomely variegated with shades of purple and red; Teas's Weeping Mulberry, and Bunge's Catalpa; this last forming a dense globe of large and showy foliage, and on specimens grafted on a good standard stem forming a particularly desirable tree for lawn use.

Our collection of Hardy Herbaceous Perennials, of which we feel that we have a very fair one, embracing as it does something over two thousand varieties at the present time, with a discardure after careful testing during the last ten years of perhaps one-half

many more, has given us food for much thought as to their sibilities in the near future. We are well aware that our soil, h its light nature admits the cultivation of many sorts that in ore retentive soil would probably prove less hardy, but leaving de the possibly tender sorts it is a pleasure to note the follow- newer kinds as perfectly hardy with us under the severest trials t we can give them, and consequently such as we would recom- nd for further trial in other soils:

Achillea Eupatorium, the Noble Yarrow, with a constant suc- sion of broad flat heads of clear lemon yellow.

Aconitum autumnale, the latest blooming of all Monkshoods.

A. Napellus var. *bicolor*, with tall spikes of blue and white.

Æthionema grandiflora, a charming evergreen, with dense ds of rich pale purple.

Ajuga Genevensis, of dense growth, completely enveloped in wy clusters of the richest blue in early summer.

Alstrœmeria aurantiaca has clusters of showy, lily-like, yellow vers, handsomely streaked with purple.

Anemone sylvestris has pure white flowers in early summer.

Aquilegia vulgaris var. *alba* (Munstead White), with purest ite flowers, is one of the most satisfactory of the Columbines, hout the objectionable dying-out habit of this class.

Arabis albida var. *variegata*.—Foliage beautifully variegated h gold and green.

Armeria maritima var. *Lauchiana*, a beautiful form of the rift, with dark green foliage, dense tufted habit, and a nearly stant succession of rich deep crimson flowers. An elegant ing plant, which might well supersede the dwarf box.

Arnebia echioides, the Prophet flower, with dense clusters of rich ow flowers, curiously spotted with fading purple.

Asperula odorata, the Maitrank of the German nation, forming ense carpet of green with intensely fragrant clusters of minute e white flowers.

Of Hardy Bamboos, the following seem to be quite reliable: *mbusa falcata*, *B. Metake*, *B. Ragamowski*, *B. Simonii*, *B. ata* and *B. viminalis*, all particularly graceful in their leaf cts.

Callirhoe involucrata, the Poppy Mallow, is nearly always in om and its rich crimson flowers are particularly showy on the es in early morning.

Campanula Van Houtteii can never be omitted from a list of really good things. Its flowering effect is simply marvellous in well established clumps.

Centaurea montana and its different varieties, particularly the pure white form, are choice for cutting and are continuous bloomers.

Delphinium Chinensis.—These are too little known and should be extolled to the utmost, producing as they do an almost constant succession of loose open panicles of beautiful flowers in the most exquisite shades of blue, lavender, and white, in many cases oddly spotted with deeper shades. For cutting purposes these should never be omitted from the flower garden.

Desmodium penduliflorum, classed either as herbaceous or a shrub, is especially desirable for its wealth of bloom just in advance of frosty weather.

Doronicum plantagineum var. *excelsum* is among the finest of spring flowers, with a wealth of rich golden yellow aster-like flowers.

Elymus glaucus is a particularly showy grass, with rich silvery foliage, and soon forms a fine clump.

The Epimediums are among my choicest favorites, with their elegant showy foliage, so odd in shape and so handsomely colored in its young growth, and the showy panicles of flowers are noteworthy among spring-blooming perennials; *E. alpinum*, with red and white starry flowers; *E. sulphureum*, pure yellow; *E. niveum*, pure white; and *E. macranthum*, with pale mauve purple Orchid-like flowers, are among the choicest of this genus.

Eulalia gracillima is a particularly showy grass with long, slender, white-ribbed leaves, the whole plant producing a vase like effect.

Glaucium Fischeri has particularly showy silvery foliage and a good supply of orange colored flowers.

Globularia tricosantha, with its tufted habit and dense heads of blue, is desirable for any well drained spot.

Gypsophila repens forms a densely branched carpet of foliage, handsomely set with clusters of small white flowers tinged with pink.

G. Steveni is an improvement over the old Chalk Plant in its dwarfer habit and more continuous blooming, and is earlier as well.

enium Hoopesii is the choicest of the Sneezeworts, forming
ıse candelabra like heads of rich golden yellow flowers.
the Helianthemums much could be said; all are evergreen,
ıg dense carpets of foliage, and in midsummer thickly
ed with yellow flowers like minute roses in the species
tifolia, *croceum*, and *vulgare*, while *H. hyssopifolium* gives us
r colored and *H. rhodanthemum* bright red flowers.
the Sunflowers, *Helianthus mollis* has glaucous, velvety
e and handsomely formed lemon yellow flowers; *H. læti-*
, with rich orange semi-double flowers on long clean wiry
, is particularly to be recommended for cutting purposes.
nerocallis Thunbergii is a welcome addition to the Yellow
ilies, coming into bloom in July and bearing rich lemon
flowers, of a mild but charming fragrance.
aurantiaca major is being tested and we have much hope
it.
Dumortierii and *H. Middendorfiana* are two orange yellow
s of recent introduction and both can be recommended.
uchera sanguinea is perfectly hardy, and would be desirable
handsomely mottled foliage alone, while the addition of its
scarlet vermilion flowers, in dense long stemmed clusters,
rs it quite unique among the good new things.
pinus polyphyllus in its clear blue, pure white, and variegated
ınd white forms, is a first-class border plant.
phalodes verna and its pure white form, both known as
ing Forget-me-nots, thrive admirably with us and form
carpets of broad foliage with clusters of blue and white or
flowers.
paver pilosum, a species of Poppy from Bothnia, with salmon
ed flowers, is in almost constant bloom.
emonium humile or *Richardsonii* is among the best of the
's Ladders, having clusters of large pure blue flowers with a
charming odor.
e hybrid Potentillas or Cinquefoils are perfectly hardy,
ıse rapidly and give a wealth of bloom in midsummer. The
ng of the semi-double forms is remarkably rich in shades of
v, orange, purple, and crimson. In their season these are
g the choicest of garden plants.
Primulas I have found a source of delight and surprise. *P.*
culata, *P. vulgaris* in all its forms, *P. officinalis*, *P. cortu-*

soides, *P. Sieboldii*, and *P. Japonica* do well, and some other sorts can with little care be safely wintered. Those noted thrive without any covering being necessary, and I have been surprised that the old-fashioned Polyanthus has not been more freely planted than it is. Nothing is more charming than a good edging of primulas, and in the open border, when planted singly or in clusters, they always command attention to the exclusion of other flowers in spite of the great wealth of bloom that we have in spring. The forms of *Primula Sieboldii* are all welcome additions and as soon as well known will be extensively planted.

There continues a great improvement in the Hybrid Pyrethrums and many deep shades of yellow and copper are appearing among the newer double sorts. In light soils we find these perennials first class in every way.

Scabiosa Caucasica is one of the most desirable plants in the entire collection, producing a profusion of large showy lavender flowers, each on a good stem for cutting. There is a shade of color in this flower quite beyond description, which is particularly beautiful. For cutting purposes this is invaluable.

Silene Virginica, the Fire Pink, I have no difficulty in growing, and this can be particularly noted as one of the most brilliant flowers that we have; a dazzling cardinal.

In Spiraeas the *palmata* section is coming rapidly to the front as well they may, their sturdy habit of growth and showy spikes of rich red rendering them among the best of their class.

Solidago rigida is the most satisfactory of the Golden-rods, producing heavy trusses of rich golden yellow flowers. This is less weedy than most sorts and altogether is very satisfactory.

The Silver Thyme is quite hardy with us and forms a neat carpet plant, with particularly showy silver and green variegated foliage.

Tricyrtis hirta, the Toad Lily, is among the most curious plants we have, giving a remarkable amount of bloom just in advance of hard frost in most grotesquely formed and colored flowers.

Among the Veronicas or Speedwells I must not fail to mention the following as quite indispensable: *V. amethystina*, a dense bushy plant with innumerable clusters of deepest amethyst blue; *V. longifolia* var. *subsessilis*, with long spikes of richest blue in late summer and continuing nearly to frost; *V. rupestris*, forming

ense low carpet of evergreen verdure quite hidden in spring
its clouds of bright blue flowers; *V. incana* with its silvery
age, setting off so well its upright spikes of lavender purple,
V. pectinata, with grayish woolly foliage and deep blue
es.

The above represent to a certain extent the less well-known
s of hardy perennials; the list is only partially complete, yet
sibly is as long as should be given to occupy the room of the
ort.

JACOB W. MANNING.

MRS. J. W. CLARK'S ESTATE, POMFRET, CONN.

On the 20th of August the Committee visited this estate, the
cial object being to inspect the vinery, from which for several
sons very fine fruit has been shown at the exhibitions by Mrs.
rk. The account given by Mr. John Ash, the successful gar-
er, will be read with interest and profit. The vinery gave evi-
ce in every way of skillful cultivation, showing at this time
e very fine fruit. Other objects of special interest might be
tioned, but at some future time a more extended report of the
unds will probably be given. It may, however, not be out of
ce to say now that the entire grounds were in excellent condi-
, having all the requirements of a first class private place.
e vegetable garden was especially noticeable, its arrangement
ng very orderly, and with a large succession of all the standard
ieties of vegetables in great abundance. The farm was quite
ature, with a large barn for storing hay and keeping the horses
cattle, all in excellent condition, and giving evidence of
d management and reflecting much credit on Mr. Ash who has
direction of the entire estate.

Mr. Ash's account of his method of cultivation is as follows:

would say, with regard to my mode of cultivating grapes
t it is very simple. I start my grapery about Febuary 15th,
a temperature of from 43° to 48° of artificial heat, allowing the
heat to run it up to from 80° to 85° with moderate ventila-
n, keeping the house at these temperatures until the buds show
ns of swelling, when I raise the artificial heat to 55°, night tem-
ature, with a day temperature of 60°. I keep the house at this
t until the vines have made a growth of about three inches, when

I again raise the temperature to from 60° to 65°, night, and from 65° to 70°, day. When starting my house I give the border a thorough soaking with water heated to 85°, repeating the operation once about two weeks before the vines are in bloom, at which time I keep the atmosphere in the house moderately dry, ventilating freely on bright days and only damping the floor about midday. This treatment is followed until the fruit is set, when I put on a top-dressing of barnyard manure and give the border a thorough watering with tepid water, repeating as often as is required. Just when the grapes commence to take their second swell, I give a copious watering with liquid manure and another similar dose just before the grapes begin coloring. After this I use only clear water, and when the grapes are ripe I keep the border as dry as possible without allowing the vines to suffer. My grapery is 50×20 ft.

The extent of this estate is one hundred acres; we have about six acres of lawn and flower garden, and about four acres of vegetable garden. We grow almost everything in the vegetable line. Besides the grapery we have a Palm house 50×20; Rose house 50×18; one house for general greenhouse flowering plants, 50×18, and a house for Carnations and Violets 100×10. The greenhouses are heated by hot water (overhead system), using two Foster boilers connected so that we can use either separately or in conjunction with each other.

W. D. Hinds's Peach Orchard.

For the best Fruit Garden an application was received from Mr. W. D. Hinds of Townsend to examine his orchard of Crosby Peaches. Not since 1881 have your Committee had an opportunity to inspect a Peach orchard; at that time we visited those of John B. Moore and Marshall Miles of Concord, and Thomas C. Thurlow of West Newbury. Those who were there remember what success these cultivators had achieved. Since then we began to think that the days of Peach cultivation in Massachusetts had ended, but this visit to Mr. Hinds quickly dispelled all such thoughts. We have endeavored to obtain all the good points we could on peach culture, and we venture a few extracts in regard to the subject. The revised edition of A. J. Downing's "Fruits and Fruit Trees of America," 1869, says, "Thousands of acres are devoted to this crop for the supply of the markets of our

cities. . . . Many growers have orchards of from
) to 100,000 trees of different ages, and send to market in
seasons as many bushels of fruit from the bearing trees."
following extract is as important now as it was when writ-
enty-seven years ago.

he very great facility with which the peach grows in this
ry, and the numerous crops it produces, almost without care,
led to a carelessness of cultivation which has greatly en-
d the stock, and, as we shall presently show, has in many
produced a disease peculiar to this country. This renders
essary to give some additional care and attention to the cul-
on of the peach; and with very trifling care this delicious
may be produced in great abundance for many successive
." "Garden and Forest," 1894, p. 467, says, "Some
thousand acres of land in Western New York are devoted
e peach industry. . . . Professor Bailey thinks
he peach industry, more than any other pomological inter-
uffers peculiarly from careless methods. The first error
k of cultivation; the second, inattention to borers and yel-
the third is neglect to thin the fruit, and the fourth is
ssness in marketing." Then follow excellent suggestions
ocations and Soils, Cultivating and Fertilizing, and Pruning
Thinning Fruit. On this last point we copy the remarks,
are practical and very useful.—"No two peaches should
lowed to develop nearer than five inches apart. No work of
rchard pays better than thinning the fruit, either in the price
the remaining produce brings or in the energy which is
to the tree. When regularly thinned the tree bears every
unless injured by frost. The fruit must be picked sooner or
and the work is more easily done in June than in Septem-
so that no labor is lost. The thinning should be delayed
the fruit is the size of the end of a man's thumb, and by this
the 'June drop' has occurred, and the fruit can readily be
" The points suggested in regard to marketing are so well
n to all cultivators that it is unnecessary to reproduce them;
e it to say that too much care cannot be exercised in handling
roperly packing; crushed and bruised fruit is not attractive
e purchaser.

Now as to the Crosby Peach, that most conservative and careful of all careful periodicals, which is always slow in indorsing a new thing, "Meehan's Monthly" for 1894, p. 77, says, "The Crosby Peach seems to be a kind that has come to stay awhile and is well suited to New England gardens. It originated near Lowell, Mass., in 1875. It is one of the sweetest of the yellow Crawford class, and a particularly abundant and regular bearer."

We give the following statements by Mr. W. D. Hinds and Mr. A. J. Hinds in the belief that they will be found of much interest.

STATEMENT OF MR. W. D. HINDS.

TOWNSEND, Mass., Nov. 9, 1895.

MR. JOHN G. BARKER:

Dear Sir:—In reply to yours of the 5th instant I will say that after seeing the Crosby Peach fruit four years in succession previous to 1888, and two years when we had no peaches of any other variety, I decided to set out an orchard as soon as I could get the trees. As the originator had died and no one else was propagating this variety I set two hundred Fox Seedling trees in the spring of 1888 and rebudded them in August with the Crosby. This being my first attempt at budding I only got about a hundred of them to grow. In the fall of 1888 I sent some buds to Hale Brothers to bud some trees for me. From these I got one hundred and fifty trees, which I set in the spring of 1890. I had also grown from three hundred to four hundred trees, which I budded myself; some of them I set out and some of them I sold. In the spring of 1891, I received about two thousand trees from Hale Brothers, selling eight hundred of this lot to my brother and some to my father and setting some of the small ones myself. I have set two or three hundred every spring since, so that I have now about two thousand trees in my orchard. About six hundred trees were in bearing this season, from which I sold over twelve hundred baskets of very fine fruit, for from one dollar to two dollars per basket.

Had it not been for the severe frosts in May, while the trees were in blossom, I should have had at least five hundred baskets more, as I had over six hundred three year old trees on which the frosts killed all the blossoms; they were as full as possible up to

ime. My orchards have been fertilized with bone tankage nuriate of potash, using the tankage in the fall and the n in the spring. Last spring I used about eight hundred s of sulphate of potash per acre. Of tankage I used from two tons per acre according to the age of the trees.

e trees have all made a satisfactory growth and bid fair now e us more fruit next year.

are just spreading on the tankage again, my brother and I nearly thirty tons this fall. We intend to do our part to est of our knowledge and if the chief of the weather bureau ribes the right kind of a winter we hope to be able to invite ommittee again to see some more Peaches.

Very truly yours,

W. D. HINDS,

Excelsior Fruit Farm, Townsend, Mass.

STATEMENT OF MR. A. J. HINDS.

G. BARKER, ESQ.:

ar Sir:—In compliance with your request I herewith give a synopsis of my experience in the Peach industry in Town- Mass.

et my first two hundred and fifty trees in the spring of 1888, hundred in the spring of 1891, and a few each spring since, g now about two thousand two hundred trees. In 1893 I rom the first two hundred and fifty trees about two hundred ifty baskets of fruit. I had about one thousand trees in ng this year, from which I took two thousand five hundred ts of fruit, and sold it at very fair prices.

om the start I have held to the clean culture method from spring until about the 15th of August, and until the third have usually sown winter rye at the last cultivation, plough- in in the spring. I have also used considerable quantities eadow hay for mulching every season. For fertilizers I have scrap and bone (tankage) and both muriate and sulphate of h and wood ashes. I have used the above in varying quan- according to the present conditions of the trees and the ous condition of the land, but sufficient to produce a vigorous th, necessitating thorough pruning twice each season to keep

the trees in shape. The growth and general appearance of the trees under the above treatment has been satisfactory.

Were I asked to name the *essentials* for the successful culture of Peaches I should say:

First. Proper selection of location and soil, which should be high and well drained.

Second. Proper setting out of the trees, which should not be too deep in the ground. Many trees make a bad start and are apt to have the yellows because set too deep.

Third. Constant and thorough cultivation throughout the growing season and watchfulness for borers and other insects.

Fourth. Close and energetic attention to pruning and thinning of the fruit. One-half of the crop should be picked by the time it gets the size of marbles.

And lastly as in most other lines of business, personal supervision and attention to details, which if I were to enumerate would make the reader tired, as well as the man whose lot it is to attend to those things closely enough to win success in the cultivation of peaches.

A. J. HINDS.

Townsend, Nov. 15, 1895.

FOREST HILLS CEMETERY, JAMAICA PLAIN.

Before calling your attention to the visit at this place, it may be well to remind you that in previous years, visits to cemeteries formed no small part of the duties of the Garden Committee. As early as 1857, 1858, 1859, and 1860, the TRANSACTIONS record visits at Woodlawn Cemetery, Chelsea, and in 1858 and 1860 to Mount Auburn, Cambridge. I cannot find that any other visit was made there. In 1866 Mount Hope, West Roxbury, was visited; it was then under the charge of the late C. M. Atkinson, who was awarded a gratuity for skill and care in its management. In 1867, Oak Hill Cemetery, Newburyport, was visited. In 1868, Mount Hope was again visited, and a gratuity was awarded for successful efforts in improving the cemetery. In 1872, Newton Cemetery was visited, and a gratuity was awarded to the Superintendent, Henry Ross, who had done much to be commended in the work of Landscape Gardening. In 1875, Woodlawn was again visited and also Newton Cemetery. In 1877, Newton Cemetery was again visited, and a gratuity was awarded for correct taste displayed

nting flower beds, and beautifying the grounds. In 1879 a
vas made to Pine Grove, Lynn; in 1884 again to Newton
ine Grove, and in 1889 again to Newton, when an award
nade for well kept grounds, and artistic laying out and im-
nent of the same. The next visit was to Forest Hills, in Rox-
1895. Since the Horticultural Society was the promoter of
Auburn Cemetery, which is known all over this continent
foreign lands, and whose influence has done so much to
ve our Rural Cemeteries, it seems eminently fitting that the
ction between the Society and the cemeteries should be main-
.

Garden Committee having expressed a wish that they
have an opportunity to visit Forest Hills, your Chair-
being the Superintendent felt that it might look like sound-
s own praises, and confessed to some diffidence in extending
vitation, but upon consultation with the President of the cor-
on, it was decided to invite the Committee with the Trustees
ther friends. On the 26th of September the invitation was
ted, and while a goodly number were present we regret that all
ere invited could not be with us. About two hours were spent
ving through the grounds giving a general idea of the place.
est Hills was consecrated June 28, 1848, and was controlled
e City of Roxbury until the year 1868, when Roxbury was
ed to Boston, and by a special act of the Legislature it was
conveyed to the lot holders and since that time has been
the control of a board of seven Trustees, one being elected
year at the annual meeting of the proprietors. This Board
ustees has full control of the affairs and property of the cor-
on, and under them all subordinate officers serve. Two
ittees attend to the business of the corporation, a Finance
nittee, and a Committee on Care of the Grounds. The area
e grounds is two hundred and four acres, finely diversified.
ast purchase, of what was known as the Milton estate on the
of the main entrance at Morton St., and directly opposite
klin Park, is a very valuable addition and being so near the
nce enables the Trustees to offer to their patrons better located
han at any time since the establishment of the cemetery.
ocation is very commanding affording a fine view of Jamaica
, Brookline, and the surrounding country. The access to
ew addition is by a rustic stone bridge of unusually fine pro-
ons, and in most excellent taste, from designs by the well

known architect, W. G. Preston, of Boston. The material for the main part of the structure is the natural pudding stone quarried in the grounds; the cap stone and all the trimmings are of Medford granite. Several prominent citizens have already purchased lots on this new part of the grounds.

The diversity of the grounds and the natural features are of immense advantage in laying them out; nature has lavishly bestowed upon them many fine features, especially in large and conspicuous boulders and natural rock surfaces, all of which have been retained, adding very much to the general effect of the grounds. An interesting and attractive feature is the grotto, or rockery, as many call it, all the rocks, of which there is a great abundance, remaining in their natural positions. This place has been improved by winding paths to the summit, where a rustic summer house is located, affording a delightful resting place. On a projecting point a bridge and a lookout enables the visitor to obtain a fine view of Lake Hibiscus, and the surrounding portion of the grounds. The ornamentation is of hardy shrubs and choice hardy and native plants and ferns, additions to which are constantly being made as the plants are re-arranged and opportunity offers. The highest point at the head of the grotto is Mount Dearborn. On Sweet-Brier path, which forms a part of this elevation is the lot in which Gen. Dearborn is interred. On it is a handsome marble vase bearing the name, "H. A. S. Dearborn," and on the base which supports it is the inscription:

"Erected by the workmen of Forest Hills Cemetery
to commemorate his many virtues."

This inscription tells the story of the monument in a simple and appropriate manner, and the flowers with which the vase is supplied testify to the sincerity of the tribute.

On the summit of the hill, but a few steps from this lot, is the Dearborn monument erected by his friends and fellow citizens. It is an elegant Corinthian column, of white marble, on a base which extends by scrolls on each side to smaller pedestals bearing funeral urns; the shaft is decorated with convex flutings; the capital is elaborately wrought, and is surmounted by a funeral urn with flame. On the front of the base is a raised tablet inscribed as follows:

"H. A. S. Dearborn,
Obiit Julii 29, 1851,
Ætat. 69."

opposite side, in a panel, is the brief, but expressive Latin
tion,

"Ossa in terra
quam dilexit, coluit, ornavit,
cives et amici mœrentes
condimus."

onument is appropriate to the character and tastes of him in
honor it is erected. It is in a lovely spot, not only bearing
ne, and near the burial place of his kindred, but one which
th him a place of frequent resort while he was spared to
the progress of the Cemetery.

he most distinguished person whose remains were originally
d at Forest Hills Cemetery, and as the designer of the
ry, if not its originator; also as the first President of the
chusetts Horticultural Society, it seems proper that more
mere passing notice should be given of his eminent services,
we copy from the early history of the cemetery.

hat is known as the old grounds, the improvements have
uite marked the past few years; nearly all the iron fences
een removed, and many of the unsightly granite curbings,
far as possible the abrupt terraces have been removed,
entle slopes substituted; large and worthless trees, of
there were many, have been cut down, and replaced
maller trees and shrubs. The grass has greatly improved
this work has been done. In many places grass walks
een substituted for gravel, for in summer time when people
he grounds most frequently, grass is much pleasanter than
to walk upon, and a grass walk adds greatly to the appear-
f the grounds, as compared with gravel. For several years
vel walks have been made.

st Hills is by no means a Lawn Cemetery, as some of the
nodern cemeteries are termed, but it is a Garden Cemetery.
rly history of the place indicates that this was the intention
projectors. From the only written history, we copy the fol-
: "One of the attractive features at Forest Hills is the
ion of flowers which bloom in some parts of it, making it in
Garden Cemetery. In most of the borders attached to the
ere are flowers in more or less abundance, besides which
re numerous triangles formed by the intersection of avenue

or paths, and other spots not quite adapted to burial lots which are prepared as flower borders, or are planted with various flowering shrubs." By this it will be seen that flowers were to form a very prominent feature in the attractions at Forest Hills, and to this time it is the same and will continue so notwithstanding the fact that some think they are a thing of past generations, and should have but a small place, if any, in the modern cemetery. In the triangles no tender plants are used, and evergreens now form a very attractive and pleasing feature at these places. Shrubs, both evergreen and deciduous have been introduced wherever they could be judiciously used; hardy plants form no small part of the ornamentation of the grounds. Tender plants are used but little beyond the private lots; there are so large a proportion of the proprietors who require them, that we can well afford to substitute other styles of planting in the ornamental beds. Sub-tropical beds when properly arranged are very attractive, and have been used to good advantage. The new flowering Cannas are freely used, and since we have found that Crotons will do well as bedding plants, they have been substituted for Coleuses. As handsome foliage plants the Acalyphas have no equal, and are certainly, like the Crotons, far superior to half-faded and sickly looking Coleuses. Half-hardy plants are found of much value, as they can be taken out at least a month earlier than the bedding plants, and remain out a month later. For the accommodation of these plants, a pit has been built the past season 80×25 feet, and is already filled with a good collection of plants, among which are fine specimens of Hollies, Myrtles, Yews, Aucubas, Laurels, Laurustinuses and the tender Retinosporas, etc.

The first Greenhouse was built in 1860; in 1868 it was removed and enlarged; in 1873 a large conservatory was built, with ranges of smaller houses. These were all heavy wooden structures, which after twenty years of use were much decayed and not worth the large cost of repairing, so that in 1893 the entire range was rebuilt in the most approved style of construction by the Lord & Burnham Co., and has proved entirely satisfactory. The total number of houses is seven, with 4,480 feet of cold frames. Plants used for spring flowering are Pansies, Myosotis, Daisies, Silenes, etc., 15,000 in all; Geraniums, 40,000; French Cannas, 8,000; Begonias, 6,000; Salvias, 3,000; Echeverias, 2,000; Coleuses, 5,000; Achyranthes, 6,000; Golden Pilea, 2,000; Abutilons,

0; Grasses, 500; Peristrophe, 700; Ageratum, 2,000; Helio-
e, 3,000; Cupheas, 800; Alyssums, 1,500; *Celosia cristata*,
0; Torenias, 2,500; Nicotianas in variety, 700; Lantanas,
Lobelias, 200; Acalyphas, 2,000; Crotons, 2,000; a total
ber of 117,700.

Receiving Tomb was built in 1871, and since that time has
greatly improved; a fine porch of elegant proportions adds
tly to the architectural appearance of the structure. In sum-
large Palms are placed at the sides under each arch, giving a
pleasing effect, while on either side are arranged large beds
alf-hardy plants. Opposite the tomb is a fountain, of elegant
gn, which was procured at the Centennial Exhibition in Phila-
hia. Around this fountain special attention is given to orna-
tal bedding, this being an unusually appropriate place for
work. Around the natural rock at the base of the bell
er and observatory is a large border filled with a choice col-
ion of hardy plants; this we consider a very interesting spot,
from early spring until late fall something is in flower.

is not possible to enumerate the large collection of trees and
bs in use: it would take up too much space, but all the choice
ering shrubs are used in large qualities.

The Observatory or Bell Tower is located on a prominent emi-
ce opposite the main entrance. The lookout, which is reached
an easy flight of steps, affords a magnificent view of the sur-
nding country in all directions. The Chapel and Office were
t in 1884, and form a very unique and convenient building.
Chapel is greatly admired, and is frequently used for funeral
poses; no description could do it justice, it must be seen to be
reciated. A system of water-pipes was introduced in 1891,
oughout the grounds, satisfactory arrangements being made
h the city for the supply of water.

The growing demands of the proprietors, with the constant in-
ase of the unoccupied portions of the grounds, rendered a
lding necessary for their accommodation at the east entrance.
is summer such a building was finished, and it is not only a great
ommodation to the patrons of the place, but a unique and
propriate ornament to that part of the grounds.

For the care of the grounds when the sale of lots shall have
sed, provision is being made by setting aside a certain per cent
m every sale now made. This is deposited in two funds, the

Perpetual Care and Permanent Funds; the first named for the care of the lots; the second for the buildings and avenues. These two funds have already attained a good sum, and will be ample in the future for the purposes for which they are intended. I have only given a very brief sketch of Forest Hills Cemetery, but certainly as much as the occasion calls for. Its fine location and attractive entrance, together with its immediate connection with Franklin Park, and the excellent drives from Boston insures for it a very promising future, and the citizens will find in the development of the grounds, that they can all be accommodated in their wishes, from those whose means are limited to others whom good fortune has blessed with a greater abundance.

Mrs. B. P. Cheney's Estate, South Natick.

The object of this visit, made on the 2d of November, was especially to see the Chrysanthemums, of which we found a good collection of well-grown plants. Mr. John Barr, gardener, informs us that he grew 700 to one stem and bloom, which were propagated in May and planted out in June. He grew them indoors all summer. There were over one hundred distinct named Japanese varieties and twenty Chinese in the collection. Mr. Barr considers that quite a number of the Japanese are not worth growing except as exhibition blooms; 500 were grown in boxes on account of the convenience of handling them, it being an easy and quick way of filling up the house, and as they are done flowering they can be cleaned out gradually and the space used for other purposes. The results of this mode of cultivation were quite as satisfactory as growing them on benches. For fertilizing, clay and sheep manure were used. Thirty plants, mostly Japanese varieties, were growing in twelve-inch pots. Those growing in boxes were particularly noticeable, and that mode of cultivation—new to at least a portion of your Committee — it seems to them might be adopted by many growers as an easy way of giving a place to this popular flower.

There are three greenhouses and two vineries, one of the greenhouses being used as a Rose house; another for growing Carnations, Cyclamens, Cinerarias, and other winter flowering plants; and the other for Palms and Foliage Plants for use in the summer season. The Palms and many other plants are placed in

e vineries, until the Chrysanthemums in boxes are removed. spring all available space is filled up with bedding plants. We re glad to notice a fine lot of the lovely Adiantum Farleyense a most luxuriant condition, the treatment being quite different om that usually bestowed upon this superb fern, which is generally nsigned to the stove; in this case it was the opposite, being in a ol house with the ventilators raised on a chilly day, November 2. The estate contains about two hundred acres, largely in woods d grass; twenty-five or thirty acres have been thoroughly enched and laid down into a lawn. A feature of the place is the any beautiful views. We hope in our next report to give a scription of this fine estate, the day of our visit being so very t that we could get scarcely any idea of the extent or beauty of e grounds. We found Mr. Barr a progressive man and a good ower, and accord to Mrs. Cheney our most hearty thanks for s delightful and profitable visit.

illiam Nicholson's Chrysanthemum and Carnation Houses, Framingham.

The last visit of the Committee was on the 4th of November, to illiam Nicholson's Chrysanthemum and Carnation houses, in gard to which he has favored us with the following letter:

Framingham, Mass., November, 1895.

ohn G. Barker, Esq.:

Dear Sir:—In reply to your request for a few items in regard the culture of Chrysanthemums and Carnations on my place, I ll say that the cuttings for my Chrysanthemums were struck the st of May and the first two weeks in June; potted into two and half-inch pots, and planted out on benches July 26, after my op of Tomatoes was through. The compost was made early in e spring, of one load of good rotted horse manure to four loads loam, with two bucketfuls of fine bone meal to every five loads loam and manure. After they began to show buds we fed ice a week with liquid bone manure; once or twice with hen anure, and top dressed once with sheep manure. We plant six eight inches apart on benches. The varieties that I deem best r market, for which strength of stem is most considered, are:

Yellow.—Early; Yellow Queen and Gold Lode. Late; Major onnaffon, W. H. Lincoln, and H. Lippincott.

White.— M. Bergman, Ivory, Mrs. Jerome Jones, Niveus, Pelican, and Minnie Wanamaker.

Pink.— Mrs. S. T. Murdock, Helen Bloodgood, Ada Spaulding, Viviand Morel, and Lady Playfair.

Dark Red.— Mrs. John Shrimpton and Cullingfordii.

These I consider best for Boston market. I think that Ermenilda will be a good pink variety for this market when it becomes better known, but it should not be grown to single stems on late-struck cuttings.

In regard to Carnations I will give you my mode of cultivation. The cuttings are taken for general stock for winter forcing from February 14 to April 1; pricked out in flats, which I prefer to pots; placed in cold frames about April 20, and planted out in the field from May to June 10. I have had splendid plants for fall use struck in April and planted in the field June 10. I prepare my ground in the following manner:

It is ploughed in the fall, about the middle of November, and left in the rough till spring; then I put on about once in three or four years eight barrels of lime to the acre, in heaps of say half a bushel. As soon as it is all powder, which will be in about ten days, or earlier if it rains, I spread all over the ground thinly. I put on about one ton of wood ashes to the acre and about five cords of manure, and plow it in about seven inches just before I plant out. I harrow it smoothly and plant the Carnations in beds, eighteen inches between the rows and fifteen inches between each plant in the row. Every fourth row I leave two feet, which makes it very handy to take out the weeds in summer. I think that it is owing to the lime and wood ashes that I am so free from all kinds of diseases, and that they present a glaucous appearance.

In regard to stopping, one must be governed by the kinds he grows and the time when he wants the flowers for market. Some kinds do not need stopping after July 25; others will need it until the last week in August.

The preparation of the loam for benches is as follows: plough up sod ground in the fall; get a car of good rotted horse manure from horses that are heavily grain fed; add one horse load of manure to four of loam, and two buckets of pure bone flour without acid; repeat that till your pile is large enough; turn two or three times and add two buckets of wood ashes to every five loads

e horse loads). I always have my benches well washed with er and then give them a heavy coat of hot whitewash from h lime.

begin to take in my plants September 1, and plant in the house ut ten by twelve inches apart — a little more or less, according he size of the plants, and after they are planted in the house inge once in two weeks with four ounces of salt to three ons of water, and the alternate week with the following formula: pound of sulphate of copper in powder, and one quart of con- trated ammonia dissolved together in an earthern jar with er enough added to make three gallons. Keep it all perfectly tight. Take a two-inch potful of this mixture and at the same e half a two-inch potful of clear ammonia and syringe alternate ks with the salt mixture.

also mulch my carnations about twice in the season with a t dressing of sheep manure.

s Mr. Nicholson has entered his Carnation house for the prize red by the Garden Committee for 1896, we will not make any ments on the very excellent house which we saw when there the 4th of November, except to say that it was a model of tness and gave every evidence of thorough practical cultivation.

he Committee have made the following awards:

Society's Prizes.

the best Vegetable Garden, to Nathaniel T. Kidder, Milton	$50 00
best Fruit Garden, to W. D. Hinds, Townsend, for superior Peach Orchard	50 00
the second best to C. S. Pratt, Reading, for a Market Strawberry Garden	30 00
the best house of Chrysanthemums arranged for effect with other plants, to Nathaniel T. Kidder, Milton	50 00
the second best to Mrs. B. P. Cheney, South Natick	30 00
the best house or houses of Chrysanthemums grown on benches, to William Nicholson, Framingham	50 00

Gratuities.

To J. W. Manning, Reading, for a superior collection of named Herbaceous Plants	35 00
To Mrs. J. W. Clark, Pomfret, Ct., for successful cultivation of Exotic Grapes	35 00
To Mrs. B. P. Cheney, for a house of Chrysanthemums grown in boxes	35 00
To William Nicholson, Framingham, for superior cultivation of Carnations	35 00
To A. J. Hinds, Townsend, for a well-cultivated and promising young Peach Orchard	35 00
To John G. Barker, Superintendent of Forest Hills Cemetery, for a well-kept and best-arranged Rural Cemetery, with choice Evergreens and Hardy and Tender Plants	50 00
Amount appropriated	$500 00
Amount awarded	485 00
Balance unexpended	15 00

For the Committee on Gardens,

JOHN G. BARKER, *Chairman.*

REPORT

OF THE

MMITTEE OF ARRANGEMENTS,

FOR THE YEAR 1895.

By J. H. WOODFORD, CHAIRMAN.

---

e are glad to be able to report a prosperous year for the
oitions of the Society just closed. The various and numerous
s during the year have at times taxed the ingenuity of your
mittee to find space in the halls for the proper display of the
ous classes offered by the exhibitors, and then have space
gh left for the comfort of visitors.

his state of things does not reflect any credit on the foresight
e Committee having our property in charge, for when we take
consideration the poor accommodations at our disposal and
very meagre net income that we receive from an investment of
a million of dollars, it seems to us that we ought to have very
h better accommodations and vastly superior facilities for our
s out of an investment of half the money. This same inade-
y of accommodation has been repeatedly referred to by the
idents of our Society, and by several chairmen of committees
heir annual addresses and reports, and still, as far as our
ety knows, no notice has been taken of their statements. We
ld suggest that the Committee having the building in charge

be called to account and their action or inaction be laid before the Society for its consideration.

The halls are not commodious enough for our great shows, and are also very difficult of access, particularly for aged persons, and there is no place for rest after anyone gets into them, except by climbing a third flight of stairs to the gallery.

We would recommend action in the immediate future with a view to acquiring a property of half the value of the present holding, and having a hall of easy access and of sufficient capacity to accommodate any and all of our exhibitions, and at the same time capacious enough to contain a large audience comfortably.

We have much pleasure in referring to the numerous commendations of exhibitors of Roses that we have received since we changed from the cumbersome, dirty boxes heretofore used in their display, to the clean bright glass vases owned by the Society. The change is decidedly to the advantage of this noble class of flowers.

We are also pleased to record the forming of an auxiliary society to ours called the Boston Mycological Club. This will be of immense advantage and value to all lovers of Mushrooms, as it will educate people to distinguish the Edible Fungi from the Poisonous.

There are at present great quantities of the edible kinds left untasted for fear that if eaten they might kill, but when the community is taught by object lessons to distinguish the good kinds from the bad, tons of this esculent vegetable will be consumed for food which now "goes to waste its sweetness on the desert air." We consider this as some progress in the right direction which we are making in the noble art of Horticulture.

The receipts for admission to the two exhibitions at which fees were exacted were larger than last year, but not nearly as large as they ought to be with proper facilities to make our shows attractive to the public.

The amount of money placed at the disposal of this Committee for extraordinary expenses has been judiciously expended and for the furtherance of the best interests of the Society. The halls have been well arranged during the season and in so judicious a manner as to produce but little friction among the numerous exhibitors.

Treasurer shows by his books receipts

the Spring Exhibition . . .	$409 00	
anthemum " . . .	1,016 50	
		$1,425 50

penses:

g Exhibition	$268 72	
anthemum Exhibition . . .	400 85	
		669 57
ng a balance in the treasury of the Society of		$755 93

of which is most respectfully submitted.

For the Committee,

JOSEPH H. WOODFORD,
Chairman.

REPORT

OF THE

Committee on School Gardens and Children's Herbariums,

FOR THE YEAR 1895.

SWAN SCHOOL GARDEN, MEDFORD.

The first systematic attempt to introduce school garden work into the schools of Medford was made at the Swan School, on the corner of Park and Washington streets, early in the season of 1895. The teachers and pupils entered into the spirit of the work with the utmost enthusiasm, and its success has inspired other schools in Medford with a desire for garden work, which it is hoped the School Committee will be able to gratify another season with means furnished by the city.

The special aim of our School Garden and Herbarium Committee being to arouse and foster an interest in, and love for native plants, particular pains were taken to aid the teachers and children of the Swan School in establishing a garden of wild plants; and the appended list shows how many of the choicer and rarer of our native shrubs, flowers, and ferns have been introduced during the first year, and indicates what the policy should be for future seasons.

The frequent visits of both teachers and children to the woods for the purpose of obtaining plants for the garden showed their interest in the work. But the large amount of land surrounding the schoolhouse, and the broad plan on which the garden was laid out, rendered it difficult to make the garden attractive, as a whole, in one season by the use of wild plants alone; therefore the use of cultivated plants was allowed, not only to ornament the grounds, but to add interest and furnish ready working material.

SWAN SCHOOL GARDENERS, MEDFORD.

SWAN SCHOOL GARDEN, MEDFORD.

result has been more than gratifying, and while the native have not been neglected, as will be seen from the subjoined cultivated flowers were the means of enabling some of ldren during the summer vacation season to contribute ng toward the pleasure of invalids in the hospitals by flowers from the Swan School garden to the Mission twice . Thus they not only received pleasure themselves and leasure to others, but were unconsciously instructed in e principles.

portion of the school grounds set apart for the garden omprises approximately between 2,500 and 3,000 square nd the different beds laid out were treated differently, ng to the character of the plants they were to receive.

general treatment was as follows :— The soil was first well up and dug over to the depth of nearly two feet, and some or more loads of rich loam and two good loads of old , rotted to pulverization, were mixed in thoroughly. The be devoted to the ferns were not made so rich, because ent was to imitate nature as far as possible.

ly all the planting except that of the trees was done by ldren under the guidance of their teachers.

ddition to the native flowering plants 150 Gladiolus bulbs, uberose bulbs, 125 Pansy plants, 25 Cannas, and 50 plants Sweet Williams, hardy Carnations, Verbenas, and Daisies planted. Cryptogamous plants were represented by 28 of hardy native ferns.

feet of garden hose with a reel, 6 watering pots, 3 sets of tools, including a spade, and 2 extra large tubs for water- were furnished, all of which will come into use next season.

e November 1, there have been planted for spring blooming 00 bulbs including hyacinths, narcissi, and tulips in variety, part of them having been furnished by the Garden Com- a large number of scilla bulbs, several fresh crowns of trich fern, mossy clumps of Polypodium vulgare, Woodsia is, Phegopteris hexagonoptera, and Iris Kaempferi.

garden has also been put in order for the winter by having rubby plants staked and the various beds raked over and d for protection.

expenses of the garden have been met from appropriations e School Garden Committee, and generous contributions Gen. Samuel C. Lawrence, Mayor Baxter E. Perry, J. Henry

Norcross, M. J. Dwyer, and others interested in seeing the experiment of school garden work tried in Medford.

The educational value of such work is beyond question, and in some European countries is considered of sufficient importance to justify legal enactments establishing and providing for it as a necessary part of a school's equipment.

Not only do these gardens beautify school grounds and make the schools more attractive to the children, but they serve the purpose of supplying, close at hand, material for nature study of a diversified character. The plants and flowers attract a variety of birds and insects, so that the children, under the guidance of an intelligent teacher, may receive object lessons in natural history that they can get in no other way without great difficulty.

The success which has attended the George Putnam and Robert G. Shaw school gardens in Boston and this new garden in Medford should be an incentive for other schools to emulate the example thus set before them, and it is to be hoped that school committees will encourage their development and support wherever possible.

I resigned from the Medford School Committee last September, but I am not without hopes that the Committee will be able another year to continue the work so successfully begun.

The following list of the native plants set out is appended for future reference and comparison:

Catalpa speciosa.
Cladrastis tinctoria.
Liriodendron tulipifera.
Magnolia glauca.
Kalmia latifolia.
Calluna vulgaris.
Asclepias tuberosa.
Aster Novæ-Angliæ.
" " var. *roseus.*
Geranium Robertianum.
" *maculatum.*
Trillium grandiflorum.
" *erectum.*
Tiarella cordifolia.
Opuntia vulgaris.
Azalea nudiflora.
Azalea viscosa.
Viburnum lantanoides.
Rhododendron maximum.
Cornus Florida var. *rubra.*
Aquilegia Canadensis.
" *chrysantha.*
" *cærulea.*
Arisæma triphyllum.
Claytonia Virginica.
Hepatica triloba.
Sanguinaria Canadensis.
Cypripedium pubescens.
" *parviflorum.*
" *spectabile.*
Viola Canadensis.
" *pedata.*
" *blanda.*

31 species and 2 varieties recorded.

mone nemorosa and some others brought by the children
t recorded.

FERNS.

unda regalis.	*Pteris aquilina.*
" *cinnamomea.*	*Polypodium vulgare.*
" *Claytoniana.*	*Aspidium cristatum* and var.
oclea sensibilis.	*Clintonianum.*
" *Struthiopteris.*	" *Boottii.*
ksonia pilosiuscula.	" *aculeatum* var.
gopteris hexagonoptera.	*Braunii.*
" *polypodioides.*	" *marginale.*
lenium Filix-fœmina.	" *acrostichoides.*
" *thelypteroides.*	" *Goldieanum.*
" *angustifolium.*	" *spinulosum* and var.
" *Trichomanes.*	*intermedium.*
odsia Ilvensis.	" *Thelypteris.*
odwardia Virginica.	" *simulatum.*
" *angustifolia.*	" *Noveboracense.*
nptosorus rhizophyllus.	

species, 3 varieties.

GEORGE E. DAVENPORT,

Sub-Committee, Swan School, 1895, to September

GEORGE PUTNAM SCHOOL GARDEN, ROXBURY.

The plants named below, numbering thirty species, were for the most part put into the garden during the warm season of 1895:

Spiranthes cernua.
Goodyera pubescens.
Clintonia borealis.
Cypripedium acaule.
Iris versicolor.
" *Pseudacorus.*
Maianthemum Canadense.
Moneses grandiflora.
Pyrola elliptica.
" *secunda.*
Chiogenes serpyllifolia.
Solidago arguta.
Aster paniculatus.
Anaphalis margaritacea.
Gnaphalium polycephalum.
Achillea millefolium var. *roseus.*
Potentilla Norvegica.
" sp.
Cornus Canadensis.
Medeola Virginiana.
Oxalis Acetosella.
Viola rotundifolia.
Linnæa borealis.
Aralia trifolia.
Asarum Canadense.
Thalictrum purpurascens.
Hedeoma pulegioides.
Parnassia Caroliniana.
Woodwardia Virginica.
" *angustifolia.*

Some cultivated plants have been added, and half a gross of hyacinth and tulip bulbs were planted in October; but the stress of the work done has been in furnishing ample means for studying wild plants as they grow.

The pupils of the first class have studied fifteen species of ferns by means of pressed specimens, specimens brought in for the lesson, lantern slides of three kinds,—first of the reproductive organs, second, of pressed specimens, third, of growing clumps in their native habitats, — and lastly by observing all the species growing in the school garden. They have studied them about six weeks, have drawn and studied all the minute parts, spores, sporangia, indusia, sori, pinnules, pinnæ, rachis, stipe, general shapes, textures, and relative positions of parts. Most of the drawing has been done on the board off-hand on call. Every pupil made a sheet of drawings of such characteristic parts as he chose; some of the drawings were colored, and the best were put

CHILDREN OBSERVING IN GEORGE PUTNAM SCHOOL GARDEN.

CHILDREN OBSERVING IN GEORGE PUTNAM SCHOOL GARDEN.

exhibition at the Mechanics' Fair. Every pupil at the end of study wrote a composition on ferns, and it remained an uncor-ted first draft.

Various classes in the school during the autumn studied mposite flowers and the distribution of seeds, by means of the terial obtained in the school garden and by visiting it. The hlia tubers and gladiolus corms have aided two classes in the l study of roots.

The garden has been established five years, and the size, auty, and vigor of the plants must be ascribed no less to proper ne in which plants can grow than to good care and changing em to suitable conditions. During these five years an attempt s been made to carry out the instructions of the Committee, mely, to stock the garden with wild native plants and economic nts, to illustrate the actual use made of the garden by means children's graphic work, and to present photographs of such nts as would give the Committee a somewhat adequate idea of e contents and condition of the garden.

Some cultivated plants, although not required, have been roduced to play a minor part, chiefly for the ornamentation of e grounds and the decoration of teachers' desks. The cultivated nts have not been named, but each native wild plant bears a pper-wired tree-tag on which its name is written.

No attempt has been made to arrange the wild native plants, ch as asters, golden-rods, and ferns, in decorative or ornamental ds; first, for the reason that the Committee in their instructions ve expressed their disapproval of mere ornamental beds; and, cond, for the reason that beds of any considerable size have en found to be of little use for practical work. When fifty-six pils at a time are to study growing plants the plants must be ac-ssible, and therefore scattered as much as is consistent with other nditions, especially that of caring for the plants and mowing e grass about them. Three or four times as many children can amine twenty plants set in rows as can examine them arranged a bed; and the work of weeding the plants and cutting the ass in the former arrangement is not half as much as in the ter.

During the long summer vacation the janitor of the school ilding weeds and waters the plants and cuts the grass period-lly. In spring and autumn he wheels in and spreads fertilizing

material, prepares new beds or rows, and resets old ones. For this work he receives ten dollars every year. When a garden has been established five years and has received yearly many additional plants, the labor involved is considerable, and it should be kept at a minimum for the salvation of the garden.

From five to eight dollars' worth of fertilizer is put into the garden at a time; this year six dollars' worth. The first prize of fifteen dollars awarded to the garden has defrayed these expenses up to this time. By this it will be seen that the garden is put on an economical and useful basis in accordance with the practical experience that comes from adapting means to ends.

H. L. CLAPP, *Principal.*

CHILDREN'S HERBARIUMS.

The Exhibition of Children's Herbariums, November 29 and
), 1895, was the most satisfactory exhibition of its kind that has
een held in Horticultural Hall. The various packages of
ressed plants were sent to the Committee very plainly and
dequately labelled, so that the allotment of space necessary to
eep each collection unbroken and the laying-out of the
pecimens were made comparatively easy. The somewhat explicit
structions in the circulars of the Committee were closely carried
ut.

The number of exhibitors, as well as the number of specimens,
as smaller than in 1894, but the quality of their work was much
perior. Some remarkable examples of pressing, mounting, and
reserving the natural colors of flowering plants were exhibited,
pecially in Arthur E. French's collection of 125 specimens,
hich were selected from a collection numbering 200 specimens
at were changed to fresh paper every day during the pressing
rocess. The preservation of the colors of the flowers was
robably due to that careful work. Master French took the first
ize for twenty ferns at our Exhibition in 1894.

Arthur C. Faxon exhibited highest grade work in sedges,
rasses, and leaf sprays of shrubs. His combination of scientific
nd artistic arrangements and naming were beyond criticism. It
as his fourth exhibition of herbarium specimens.

Gordon Weinz, a little boy eight years old, took the second
ize for fifty flowering plants. His interest in the other children's
ollections was pleasant to see.

Phillips Barry contributed this year for the fourth time, and
ave evidence of his earnestness, industry, and knowledge, in the
rm of one hundred flowering plants that he had not previously
hibited, among them being fourteen orchids, some of which
e quite rare.

The fern collections, though not large, were of fine quality, and
e labelling in vertical writing was the finest ever seen at our
hibition, especially that done by Theresa Cohn and Lulie D.
llis. The ferns of the latter exhibitor were exceptionally fine.

From such work every observer and exhibitor may learn that care in every particular is necessary to insure a fine exhibit.

The labelling was much more correct than in any previous year of our exhibition; but the Committee were unable to identify some rare specimens, owing to a lack of such herbarium specimens as it was suggested last year that this Society should have for permanent reference.

In 1894 twenty-eight children exhibited sheets of leaves, two on a sheet, to the number of eight hundred. The work bore evidence of haste and transitory interest, and the Committee concluded that it was not of sufficient educational value to be continued. They restricted the work on leaves to sprays mounted on regular botanical sheets, which are twice the size of the sheets used by the children for leaves last year; consequently, a large number of leaf contributors dropped out, there being but one contributor this year. Nevertheless, the quality of the whole exhibition has been obviously improved.

Sedges, grasses, and ferns, which require more careful study and are more difficult to name correctly than flowering plants, taken together were more numerous than last year. There was a gain in sedges and grasses and a loss in ferns. Sedges and leaf sprays of shrubs were displayed at our exhibition this year for the first time.

The service that some of these young botanists have rendered and are likely to render in botanical work may be indicated by mentioning some of the donations of herbarium specimens which they have already made. The following notice was taken from the "Jamaica Plain News:"

"Arthur C. Faxon of School street, has lately made and presented to the George Putnam school a most valuable collection, consisting of the pressed and mounted leaves of eighty-four native trees of Massachusetts. Many of the sheets contain the flower and fruit in addition to the leaves, and the specimens are so gracefully arranged as to testify to Master Faxon's artistic skill in grouping, while the careful mounting and labelling make the collection an instructive guide to a knowledge of our own trees. Such earnest and accurate work cannot fail to have a stimulating effect upon the many children whose privilege it will be to examine it, and the school is much indebted to Master Faxon for this important waymark in its study of nature."

Already the teachers of the school in their work with leaves have often had the privilege of examining the collection.

At the close of our last exhibition Phillips Barry presented to the George Putnam school eighty-seven exhibition specimens of flowering plants and ferns. These will form an important addition to the working material of the school.

Miss Ann E. Newell of South Boston, has presented to the same school some pressed specimens of rare ferns from the island of St. Helena. The gift was suggested by her seeing our exhibition.

Even in these young botanists we can discern the spirit of the scientist. No sooner does he learn the secrets of nature than he desires to share his knowledge with others. So he gives his time and material. Some of these young people may become eminent in the future, and we hope this Society may have occasion to refer with pride to the steady encouragement it gave them at the beginning of their botanical work.

The encouragement given to the exhibition in the form of appreciative and generous notices by the representatives of the daily newspapers is well worth mentioning. Undoubtedly the excellent attendance on the second day was largely owing to those notices.

This year premiums for school herbariums are offered. A few pupils in many schools will be able to contribute specimens for their own schools and the aggregate will be large. If an herbarium, with plants properly identified and labelled by the aid of our Committee, can be thus formed in each of many schools, teachers and pupils alike will be stimulated to carry out the work contemplated by the Committee, and at the same time have one of the most practicable means of continuing the work from year to year, although the teaching corps may change yearly. An attractive and permanent herbarium will be like a sheet anchor to hold the plant work to its true course.

PRIZES AND GRATUITIES AWARDED FOR SCHOOL GARDENS AND CHILDREN'S HERBARIUMS, 1895.

SCHOOL GARDENS.— George Putnam School, first and Robinson's "Ferns in Their Homes and Ours," special prize for the best collection of growing ferns.	$15 00
Swan School, Medford, second and "Ferns in Their Homes and Ours," special prize for the best collection of flowering plants.	12 00
Also special prize to Swan School for excellence of first year's work	5 00
CHILDREN'S HERBARIUMS. FLOWERS.— First prize for one hundred and twenty-five specimens, Arthur E. French	5 00
First prize for fifty specimens, Carrie P. Webber	2 00
Second prize for fifty specimens, Gordon Weinz	1 50
Gratuity for fifty specimens, Bertha Rowe	1 25
Gratuity for fifty specimens, Ethel M. Thomas	1 00
Special prize for one hundred additions, Phillips Barry	4 00
Special prize for twenty-five additions, Willis H. Weinz	1 00
GRASSES.— First prize for ten specimens, Phillips Barry	1 00
Second prize for ten specimens, Willis H. Weinz	50
Special prize for ten additions, Arthur C. Faxon	2 00
SEDGES.— First prize for thirty specimens, Arthur C. Faxon	3 00
First prize for twenty specimens, Arthur E. French	2 00
FERNS.—First prize for fifteen specimens, Lulie D. Ellis	3 00
Second prize for fifteen specimens, Christine L. Lewis	2 00
First prize for ten specimens, Bernice L. Dole	1 75
Second prize for ten specimens, Katherine Dewey	1 25
Gratuity for ten specimens, Mabel M. Wood	1 00
Gratuity for ten specimens, Theresa Cohn	1 00

Gratuity for ten specimens, Genevieve Goudy .	$1 00
Gratuity for ten specimens, Phillips Barry . .	1 00
Special prize for nine additions, Ethel M. Egan .	2 25
SHRUBS.—First prize for thirty specimens, Arthur C. Faxon	2 00
EXTRA AWARDS.— Arthur E. French for special excellence in pressing and mounting flowers . .	2 00
Arthur C. Faxon for special excellence in pressing and mounting leaves	1 00
Carrie P. Webber for excellence in pressing and mounting succulent plants	1 00
Miss Webber also placed on exhibition specimens of grasses and sedges, Gratuity	75
Amount of Premiums for School Gardens . . .	$32 00
" " " " Herbariums . . .	34 25
" " Gratuities for Herbariums and excellent work	11 00
Total awards,	$77 25

OTHER EXPENDITURES.

Paper, printing, bulbs, expressage, exhibition expenses, garden appropriations, etc.	$73 36
Total, ...	$150 61
Balance of appropriation ($250) on hand, .	$99 39

HENRY L. CLAPP, Roxbury,
MRS. H. L. T. WOLCOTT, Dedham,
GEORGE E. DAVENPORT, Medford,
MISS KATHARINE W. HUSTON, Roxbury,
MRS. P. D. RICHARDS, West Medford,
WILLIAM P. RICH, Chelsea,
W. E. C. RICH, *Secretary*,
99 Moreland St., Roxbury, Mass.

Committee on School Gardens and Children's Herbariums.

REPORT OF THE DELEGATE

TO THE

Massachusetts State Board of Agriculture,

FOR THE YEAR 1895.

By E. W. WOOD, of West Newton, Delegate.

The Legislature of Massachusetts as early as 1819 took action for the aid and encouragement of Agricultural Societies by passing the following act:

An Act for the encouragement of Agriculture and Manufactures.

Sec. 1. Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, That every incorporated Agricultural Society within this Commonwealth which shall have raised by subscription of individuals, or which may hereafter raise by such subscription and put out to interest on public or private security the sum of one thousand dollars as a capital stock appropriated for the uses of said society, shall be entitled to receive in the month of October annually out of the treasury of this Commonwealth the sum of two hundred dollars; and also a proportionable sum annually for any greater sum which they should so subscribe and put out to interest as a capital: Provided, always that no agricultural society shall receive by virtue of this act within one year any greater sum than six hundred dollars.

Additional sections provide for the formation of new societies and the limitation of their boundaries; and also require all societies receiving the benefit of this act to file in the office of the Secretary of the Commonwealth annually, in the month of October, a certificate signed by the President and Treasurer of such society speci-

nder oath the sum actually subscribed and put out to inter-
lso to transmit to the Secretary's office in the month of
annually an official statement of their proceedings in rela-
the expenditure of the money received from the State.

above act with certain amendments required as the number
eties increased, and by the transfer of the work from the
the Secretary of State to the office of the Secretary of the
oard of Agriculture, is substantially the law at the present
it relates to the connection of the State with the Agricul-
cieties.

April 12, 1837, the Legislature passed the following Re-

lved, That His Excellency the Governor, by and with
ice of the Council is hereby authorized and requested to
some suitable and competent person whose duty it shall
er the direction of His Excellency the Governor, to make
icultural Survey of the Commonwealth, collect accurate in-
on of the state and condition of its Agriculture and every
connected with it, point out the means of improvement,
ke a detailed report thereof with as much exactness as cir-
nces will admit.

lved, That a summary of such survey and examination shall
nished to His Excellency the Governor every six months
ne whole shall be completed; and at such other times, as
e required, to be published in such way and manner as he
e advice of the Council shall deem to be expedient and use-
nd he is authorized to draw his warrants from time to time,
he treasury for such sums, as may be necessary to defray
penses of said survey, and to enable the person, so appointed,
ceed in the execution of the duties, that shall be required of
and to pay the same to him, not exceeding the sum of two
nd five hundred dollars per annum.

Henry Colman was appointed Commissioner on the 27th of
suing May. He published four reports, which were widely
ted in this country and attracted favorable attention abroad.
esolve was repealed and the office discontinued, by chapter
the Resolves of 1841. In one of his reports Commissioner
n made the first published suggestion of a State Board of
lture.

The commissioners to whom were referred the resolves of the Legislature of 1850, concerning the establishment of an agricultural school, etc., in their report in January, 1851, recommended the establishment of a State Department of Agriculture, which should sustain a similar relation to Agriculture and the schools connected with it, as the Board and Secretary of Education do to the primary schools.

In 1850, Hon. Amasa Walker, Secretary of the Commonwealth, wrote: "But something it is believed may be safely attempted, a beginning may be made, a Board of Agriculture may be established by the authority of the State; corresponding in its general features to the Board of Education. Such a board might at once be empowered to employ an able secretary whose whole time shall be devoted to the work of obtaining and diffusing information on the subject of agricultural education, and whatever else concerns the great farming interests of the Commonwealth."

The first meeting of the voluntary Massachusetts Board of Agriculture was held September 3, 1851, at the State House, Boston. The following list of officers for a permanent organization of the Board was reported and accepted: President, Marshall P. Wilder; Vice-Presidents, Henry W. Cushman, John W. Lincoln; Corresponding Secretary, Allen W. Dodge; Recording Secretary, Edgar K. Whitaker.

At the second meeting of the Board, January 14, 1852, it was

Resolved, That inasmuch as Agriculture is the chief occupation of her citizens, the Commonwealth, in the organization of its government, should be provided with a Department of Agriculture, with officers commensurate with the importance of the duties to be discharged, of the abilities to be required, and of the labors to be performed.

Through the earnest efforts of the Board and the active cöoperation of the agriculturists throughout the State, the Legislature of 1852, with great unanimity passed the following act.

ACTS 1852, CHAPTER 142.

An Act to establish a State Board of Agriculture.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same as follows:

1. A State Board of Agriculture is hereby established, to t of His Excellency the Governor, His Honor the Lieutenant nor, and the Secretary of State *ex officiis;* of one member from f the Agricultural Societies in the Commonwealth that re- an annual bounty from the State, and of three members to pointed by the Governor and Council. Said members shall heir offices for three years, except as hereinafter provided; ne Governor and Council, and the Agricultural Societies as aid, shall, within sixty days after the passage of this act, nt said members; and afterward whenever vacancies shall

3. It shall be the duty of this Board to investigate all such cts relating to improvement in Agriculture in this Common- , as they may think proper; and they are hereby empowered e, hold in trust, and exercise control over any donations or sts that may be made to them for promoting agricultural edu- , or the general interests of husbandry.

the societies receiving bounty from the State are required to in premiums an amount at least equal to the amount received, o hold every year three institutes, the Board furnishing one er to open the discussion.

ce 1863 the Board has held in December annual winter meet- continuing three days, in different parts of the State, when ltural and horticultural subjects have been discussed; and nual business meeting in February, when reports from the ctors visiting the exhibitions of the societies are received, s by members upon subjects selected at the previous meeting ad, and committees elected to perform the routine work of ear. The proceedings of these meetings are published in nd fifteen thousand copies are distributed by the members of egislature, Agricultural and Horticultural Societies, Granges, armer's Clubs throughout the State.

e work of the Board has been much increased within the past ears. In 1891 the Legislature passed an Act to provide for rotection of Dairy Products, and to establish a State Dairy u. The execution of the provisions of this Act was placed e Board of Agriculture; also the duties required by an Act, d in 1891, to authorize the State Board of Agriculture to t and circulate information relating to Abandoned Farms;

also an act, passed in 1891, to provide against Depredations by the Insect known as the *Ocneria dispar* or Gypsy Moth. For carrying out the provisions of this act the State has already appropriated more than half a million dollars.

The officers of the Board are, a President, who is the Governor of the Commonwealth, two Vice Presidents, a Secretary, and eight Standing Committees; said committees to consist of five members each, except the Executive Committee, which consists of seven members being composed of the Chairmen of the seven other committees.

The eight Standing Committees are, an Executive Committee, a Committee on Agricultural Societies, a Committee on Domestic Animals and Sanitation, a Committee on the Gypsy Moth, Insects and Birds, a Committee on the Dairy Bureau and Agricultural Products, a Committee on the Agricultural College and Education, a Committee on Experiment and Station work, and a Committee on Forestry, Roads, and Roadside Improvements.

At the present time the number of members constituting the Board of Agriculture is forty-six.

E. W. WOOD,

Delegate from the Massachusetts Horticultural Society.

REPORT

TO THE

STATE BOARD OF AGRICULTURE,

FOR THE YEAR 1895.

By GEORGE CRUICKSHANKS, OF FITCHBURG.

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e exhibitions of the Massachusetts Horticultural Society for have closed. The year has been one of advance in every- pertaining to horticulture in fruit, flower, and vegetable. ectures delivered before this Society, in one of its halls, were ttended. Those of this season's course were as follows:

nuary 12. Days with our Birds, by Mrs. Kate Tryon, Cam- e.

nuary 19. Flower Pots and their Manufacture, by A. H. , North Cambridge.

nuary 26. Fungous Diseases of Ornamental Plants, by Pro- r Byron D. Halsted, New Brunswick, New Jersey.

bruary 2. Hardy Plants and Shrubs and their Arrangement, Wilkinson Elliot, Pittsburg, Pa.

bruary 9. Glass Houses, their Construction and Heating, by y W. Gibbons, New York.

bruary 16. Economic Entomology in Relation to Trees, bs, and Plants in Parks and Private Grounds, by E. B. nwick, New York.

bruary 23. Experimental Evolution amongst Plants, by ssor L. H. Bailey, Ithaca, New York.

rch 2. A Talk on Gardens, by David Hill Coolidge, Jr., on.

rch 9. Budding and Grafting, by Jackson Dawson, Arnold retum, Jamaica Plain.

March 16. Tomatoes, by Professor W. M. Munson, Orono, Me.

March 23. Edible Native Fungi, by Hon. John M. Kinney, Boston.

March 30. Commercial Fertilizers, as applied to Horticulture, by Professor W. H. Jordan, Orono, Me.

The amount appropriated to be awarded in Prizes and Gratuities during the year 1895, was $8,250.

The Spring Exhibition began March 26, and continued four days. The Upper Hall was devoted to a fine show of pot plants, comprizing the different classes of Spring Flowering Bulbs, such as Hyacinths, Tulips, Narcissuses, and Jonquils, and a fine display of Cinerarias, Cyclamens, Orchids, and Azaleas. The Lower Hall was devoted to an excellent show of cut flowers and early vegetables.

The Annual Exhibition of Fruits and Vegetables began October 2, continuing two days. The show of fruit has not been surpassed by this Society; many of the specimens were of extra size and of fine form and color. The vegetables were all of excellent quality. Very large exhibits of Tomatoes and Potatoes were made.

The crowning exhibition of the year, the Chrysanthemum show, which is looked forward to with great interest by all lovers of the beautiful in flowers, opened November 5, to hold four days.

The Upper Hall was devoted to the display of pot plants. The Committee of Arrangements are entitled to much credit for the plan of arranging the plants in groups so as to give the best effects. Each exhibition of a group of plants arranged for effect was limited to one hundred and fifty square feet, the very liberal premiums offered bringing out the best.

On entering the Lower Hall, which was devoted to the cut flowers, several tall vases filled with large flowers of all the different colors met the eye of the visitor. The cut flowers were all of fine quality; the row of vases in front of the platform has not been equalled. The number of exhibitors was larger than heretofore; besides the growers of Massachusetts, those of New Hampshire, Connecticut, New York, and New Jersey entered the race for the coveted prizes. The Chrysanthemum show of 1895 for large flowers, fine form, purity of color, and robust, healthy foliage has not been equalled.

GEORGE CRUICKSHANKS,
Delegate.

REPORT

OF THE

OMMITTEE ON THE LIBRARY,

FOR THE YEAR 1895.

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thing startling has occurred in the affairs of the library g the year. As in former years there has been no difficulty ending all our available funds to good advantage, and, as , a full list of all purchases, as well as of books and pam- s received as gifts, will be found in the TRANSACTIONS in due It is not necessary to name many of these acquisitions but the completion of the Hortus Kewensis is an event of exceptional importance that it deserves especial mention. ably no work we possess will be more useful than this, which for species what Bentham and Hooker's great work does for enera of plants.

nother work, our Catalogue of Plates, is, we believe, of equal rtance within the limits of our own library, and even outside is place and Society it has proved of value and will be more more so as time goes on. We are of opinion that no money Society has appropriated has been spent to better advantage, we take pleasure in stating that the advance made in it this has been no less than in former years.

is report would hardly be recognized as emanating from the nittee on the Library if no mention were made of the lack of ; and yet it seems hardly necessary to speak of it with such ject lesson continually before our eyes. Wherever we look

we see books in places where no books should be, — on the tables and on the floor, and hundreds of other books there are which ought to be in sight but which are packed away behind others, just as they were last year and the year before and the year before that. "These things ought not so to be."

For the Committee,

W. E. ENDICOTT,
Chairman.

If the arrangement of the TRANSACTIONS generally adopted were kept up, the List of Library Accessions would here follow the Report of the Committee on the Library, but so much time is unavoidably required to prepare this list that, in order not to delay the printing of the TRANSACTIONS, the Committee on Publication have directed that the List of Library Accessions be published in a separate pamphlet as Part III of the TRANSACTIONS for 1895.

REPORT

OF THE

SECRETARY AND LIBRARIAN,

FOR THE YEAR 1895.

ıe report of the work in these departments is, from the neces- of the case, in many respects very similar in one year to that ıother. The records of the Society as well as those of three mittees have been faithfully and acceptably kept, as also es of the records of Prizes and Gratuities awarded. The racts of the lectures delivered before the Society have, as every Meeting for Discussion during the preceding twelve s, been placed on the table on the succeeding Saturday. The edule of Prizes for 1895 was, as it has been every year for y years, ready at the beginning of the year, and that for 1896 form no exception to this rule. That the publication of the NSACTIONS has not been equally prompt is due partly to the ease in size, especially in the most difficult part, the List of ary Accessions, which more than doubled in length in the e years from 1891 to 1894. This has conspired with other ımstances beyond my control to cause delay which, however voidable, is much to be regretted. The revision of the Consti- on and By-Laws, extending over much more time and going ugh more changes than usual, added much to the work in the retary's department.

have spoken of the great increase in the accessions to the rary, but this means not only more work in preparing the ted list, which may be considered as an annual supplement he Catalogue published many years ago, but means more than

double the labor in collating the books, in looking out for the completion of series, in recording, in cataloguing, and in all that is required before they can be placed on the shelves ready for use by the members of the Society here and in their homes. Under the ideal administration this should be done as speedily as possible. It would seem that with proper facilities it should be effected, on the average, in a week after the books are received, but this has been found impossible, for two reasons, — first, the force employed is entirely insufficient, being no greater than before the extraordinary increase in rapidity of growth of the Library; and, second, the shelves are entirely inadequate to contain the books. From these two causes the work on the Library is continually hampered and embarrassed. We need not be surprised at the rapid increase of horticultural literature, for while research and publication in every other department of science and knowledge is more active than ever before, it would be strange if botany and horticulture should form an exception to this activity. It is not intended to question the statement of the Committee having in charge the provision of better accommodations for the Society that every effort within reason has been made, but on the contrary the difficulties in the way when this report was made, as well as those which have occurred since, are fully recognized. But it is submitted, with entire confidence, that until that time in the indefinite future, when adequate provision for all our needs shall have been made, it is absolutely necessary that some temporary provision be made for the bestowal of our books. If any proof of this statement is desired a glance around this room will supply it.

In this connection I wish to say that I have heard with much regret that members of the Society have been deterred by the crowded state of the Library Room from attempting to use the books when they desired. I hope that no one will be deterred by this or any other cause from asking for any book that he wishes to read or consult, in the assurance that if we cannot do for him all that he could wish, all those employed in the room will do everything in their power to facilitate his researches.

In former years, when both halls have been leased, this room has been the only resource in case of a Saturday exhibition of horticultural products. This contingency has not occurred for some time, but it is liable to occur again, and it is desirable to be

red for it, and not to be obliged to remove valuable books at
nent's notice, to the great danger of their injury. Moreover
uestion to what place they shall be removed, even for a few
, is one not easily answered.

ong the more important additions to the Library during the
I would mention first, a set of Nature, in forty-seven volumes,
ift of Waldo O. Ross, a former Chairman of the Library
nittee, whose zeal for the improvement of the Library has
ed no diminution in the seventeen years since his retirement,
here is no room in our bookcases for his valuable donation.
ose monumental works, the Index Kewensis and the Silva of
America, the former has been completed, and the latter has
good progress, volumes seven and eight having been placed
e shelves this year. Kniphof's Botanica in Originali, in four
volumes, is interesting as being one of the first, if not
lly the first, work of considerable extent in which the process
ture-printing was employed to illustrate plants. It was sup-
that a copy in the library at Kew Gardens was unique in being
ed, but the twelve hundred plates in ours are all colored, and
ms to be in every way as good a copy as that at Kew. That
able work, Kerner and Oliver's Natural History of Plants
been completed. A set of the London Journal of Botany,
has long been a desideratum, as one member of a series
ng substantially one work, all the others of which we have
possessed, has at last been secured, and a set, as far as pub-
l, of the later Annals of Botany has been purchased. A set of
bour's Flora Rossica, in five folio volumes, with five hundred
ed plates, remarkable for the minuteness of the engraving, is
g our most important acquisition in its line, and a set, in six
o volumes, of William Gilpin's works on Landscape Garden-
and Forest Scenery is a valuable addition to our collection of
s on that subject. A set in sixteen volumes of The Gardener,
iodical edited by William and David Thomson, from 1867 to
, though less costly than the books above mentioned, finds an
opriate place in our library. Les Orchidées Exotiques et leur
ure en Europe, by Lucien Linden, and Le Livre des Orchidées,
he Comte de Kerchove de Denterghem, are two solid and
able works on that family of plants. The great interest which
been awakened during the past year in Edible and Poisonous
gi has led to the purchase of such works on that subject as

seemed most desirable. The number of Nursery and Seed Catalogues arranged during the year is probably greater than in any other year since we began to collect them. The whole collection has, during the year been alphabetically arranged and counted, and found to number over seven thousand.

The work of arranging and binding such books as were most in need has been steadily pursued. The periodicals annually bound form no small addition to our Library, and besides those a large proportion of the books bought are received in parts which require to be bound as soon as completed. The work of binding the agricultural newspapers, which for the last five years have been preserved as permanent additions to the Library, has not yet been begun, but it should not be much longer delayed.

ROBERT MANNING,
Secretary and Librarian.

TREASURER'S REPORT

FOR THE YEAR 1895.

ACHUSETTS HORTICULTURAL SOCIETY *in account current to December 31, 1895, with* CHARLES E. RICHARDSON, *Treasurer.*

95.	DR.			
31.	To amount paid on account of the Library, in 1895, viz.:			
	For books, periodicals, and binding .	$403 00		
	From income of Stickney Fund, expended for books	771 90		
				$1,174 90
	To amount paid Interest on Funds for Prizes, credited below	$1,892 72		
	To amount paid Interest accrued on $5,000 Bonds for Sinking Fund . . .	101 88		
				1,994 60
	To amount of Prizes awarded in 1894, paid in 1895, as follows:			
	For Plants, ...	$1,887 90		
	" Flowers, ...	2,301 70		
	" Fruits, ...	1,716 00		
	" Vegetables, ...	1,089 00		
	" Gardens and Greenhouses . .	385 00		
	" H. H. Hunnewell Prizes for Rhododendrons, ...	105 00		
	" H. H. Hunnewell Triennial Prize .	160 00		
				7,644 60
	To amount paid on account of Committee on School Gardens and Children's Herbariums			150 61
	unt carried over, ...			$10,964 71

Amount brought over, ...		$10,964 71
To amount paid Salaries of Secretary and Assistant, and Treasurer .	$3,600 00	
" " Salaries of members of Committees	1,010 00	
" " for extra services in Library and on Transactions . .	821 05	
" " on account of Committee of Arrangements . . .	400 00	
" " on account of Committee on Publication and Discussion	265 00	
" " on account of Committee on Large, Old, and Interesting Trees	50 00	
" " for Labor, including Janitor and Fireman . . .	2,755 15	
" " $5,000 in Bonds of West End Street R. R. Co. . .	5,162 50	
" paid for Heating	572 08	
" " Taxes for 1895 . .	2,560 00	
" " Insurance . . .	68 56	
" " City Water Rates . .	117 40	
" " Card Catalogue of Plates .	100 00	
" " Repairs	662 06	
" " Lighting	953 31	
" " Incidentals . . .	695 15	
" " Stationery, Printing, and Postage . . .	1,321 22	
" " Commission . . .	6 25	
" " Furniture and Exhibition Ware	320 15	
" " Legal Services . . .	500 00	
" advanced to A. P. Loring . .	5,000 00	
" paid William Caselden . .	50 00	
		$26,989 88
Total payments in 1895		$37,954 59
Balance of Cash on hand, December 31, 1895 . . .		7,495 35
		$45,449 94

95.	Cr.			
1.	By Balance of account rendered December 31, 1894			$13,541 89
	By Receipts from Building in 1895, viz.:			
	Rent of Stores	$17,450 00		
	" Halls	5,752 68		
			$23,202 68	
	By Income from Mount Auburn Cemetery		2,308 03	
	" Received Massachusetts State Bounty		600 00	
	" " from Annual Exhibitions, gross amount	$1,425 50		
	Less expenses	669 57		
			755 93	
	" " from Admissions and Assessments		1,348 00	
	" Interest received on Bonds	$1,237 50		
	" " " on Deposits in Bank	74 69		
	" " " from all other sources	60 00		
			1,372 19	
	" amount received from sale of Transactions		3 00	
	" " " " sale of one copy of History		2 50	
	" " " " H. H. Hunnewell, 1894 prize money		20 00	
	" " " " sale of duplicate book		3 00	
	" Insurance		400 00	
	" Interest credited to the following Funds against charges above:			
	Samuel Appleton Fund, $1,000, at 5%	$50 00		
	John A. Lowell Fund, $1,000, at 5%	50 00		
	Theodore Lyman Fund, $11,000, at 5%	550 00		
	Josiah Bradlee Fund, $1,000, at 5%	50 00		
	Benjamin V. French Fund, $500, at 5%	25 00		
	H. H. Hunnewell Fund, $4,000, at 5%	200 00		
	William J. Walker Fund, $2,354.43, at 5%	117 72		
	nts carried over,	$1,042 72	$30,015 33	$13,541 89

Amounts brought over, ...	$1,042 72	$30,015 33	$13,541 89
Levi Whitcomb Fund, $500, at 5%	25 00		
Benjamin B. Davis Fund, $500, at 5%	25 00		
Marshall P. Wilder Fund, $1,000, at 5%	50 00		
John Lewis Russell Fund, $1,000, at 5%	50 00		
Josiah Stickney Fund, as per indenture	700 00		
		1,892 72	
			31,908 05
			$45,449 94

E. & O. E.

CHARLES E. RICHARDSON, *Treasurer.*

Boston, December 31, 1895.

Approved:

H. H. Hunnewell,
A. Hemenway,
Francis H. Appleton,
} *Finance Committee.*

ETS AND LIABILITIES OF THE MASSACHUSETTS HORTICULTURAL SOCIETY,

DECEMBER 31, 1895

ASSETS.

Estate,		$250,000 00	
otype Plates and copies of History		257 00	
go, Burlington & Quincy R. R. Bonds		1,500 00	
ng Fund		23,872 50	
s City, Clinton & Springfield R. R. Bonds		1,980 00	
Receivable		304 85	
ry		34,812 62	
iture and Exhibition Ware		6,988 91	
Loring		5,000 00	
from tenants, December 31, 1895		1,687 74	
		7,495 35	
			$333,898 97

LIABILITIES.

gage		$1,000 00	
h Stickney Fund, payable to Harvard College,			
9		12,000 00	
Funds invested in the Building, viz.:			
nuel Appleton Fund	$1,000 00		
n A. Lowell "	1,000 00		
eodore Lyman "	11,000 00		
iah Bradlee "	1,000 00		
njamin V. French "	500 00		
H. Hunnewell "	2,500 00		
lliam J. Walker "	2,354 43		
vi Whitcomb "	500 00		
njamin B. Davis "	500 00		
	$20,354 43		
Funds invested in Bonds:			
H. Hunnewell Fund	$1,500 00		
rshall P. Wilder "	1,000 00		
hn Lewis Russell "	1,000 00		
	3,500 00		
		$23,854 43	
s for 1895, payable in 1896		8,250 00	
			45,104 43
Surplus			$288,794 54

CHARLES A. RICHARDSON,
Treasurer.

Membership Account of the Massachusetts Horticultural Society, December 31, 1895.

Life Membership per last report	556		
Added during 1895	23		
Commuted from Annual	8		
		587	
Deceased		24	
			563
Annual Members per last report	237		
Added during 1895	8		
		245	
Commuted to Life Membership	8		
Deceased	6		
Dropped for non-payment for two years	6		
Resigned	3		
		23	
			222
Present membership			785

INCOME FROM MEMBERSHIP.

23 new Life Members @ $30	$690 00
8 " Annual Members @ $10	80 00
8 commuted to Life @ $20	160 00
Annual assessments	418 00
	$1,348 00

CHARLES E. RICHARDSON, *Treasurer.*

Dr. Massachusetts Horticultural Society in account with the Proprietors of the Cemetery of Mt. Auburn. Cr.

For Sales and Improvements within the Cemetery for the year ending December 31, 1895.

To cost of filling up and improving land at Mt. Auburn for the year ending December 31, 1895, the Massachusetts Horticultural Society being charged with their proportion of the same:				By sales in January	$385 00
				" " February	545 00
				" " March	—
				" " April	1,190 00
				" " May	2,298 00
				" " June	1,516 00
				" " July	538 00
				" " August	385 00
				" " September	906 40
				" " October	420 00
				" " November	1,490 00
				" " December	845 00
					$10,518 40
Birch, to Eagle and Cherry Avenues	$120 94			Net amount received from Receiving Tomb	974 00
Larch Avenue	247 88				$11,492 40
Glen Avenue	491 44			Deduct for Annual Expenses	1,400 00
	$860 26				$10,092 40
One quarter of $860.26 is	$215 07				
Balance due Mass. Horticultural Society	2,308 03				
		$2,523 10			
		$2,523 10		Mass. Horticultural Society ¼ part of $10,092.40	$2,523 10

E. & O. E.

H. B. MACKINTOSH, *Treasurer.*

DECEMBER 31, 1895.

THE MASSACHUSETTS HORTICULTURAL SOCIETY
To the PROPRIETORS OF THE CEMETERY OF MOUNT AUBURN, *Dr.*

For one-fourth part of the following Expenditures, for grading new lands for sale during the year 1895:

Birch to Eagle and Cherry Avenues

52½ days, men	$118 13	
¾ day, man and horse	2 81	
		$120 94

Larch Avenue (near Maple Avenue).

31 days, men	69 75	
47½ days, man and horse	178 13	
		247 88

Glen Avenue.

208 days, men	468 00	
6¼ days, man and horse	23 44	
		491 44
		$860 26
One-fourth of $860.26 is		$215 07

MOUNT AUBURN, December 31, 1895.

JAMES C. SCORGIE,
Supt. of the Cemetery of Mount Auburn.

I certify the foregoing to be a true copy of improvements for the year 1895, rendered by the Superintendent.

H. B. MACKINTOSH, *Treasurer.*

Massachusetts Horticultural Society.

FFICERS AND STANDING COMMITTEES FOR 1896.

President.
FRANCIS H. APPLETON, OF PEABODY.

Vice-Presidents.
ARLES H. B. BRECK, OF BRIGHTON. WALTER HUNNEWELL, OF WELLESLEY.
GUSTUS PARKER, OF ROXBURY. BENJAMIN P. WARE, OF CLIFTON.

Treasurer and Superintendent of the Building.
CHARLES E. RICHARDSON, OF CAMBRIDGE.

Secretary and Librarian.
ROBERT MANNING, OF SALEM.*

Professor of Botany and Vegetable Physiology.
BENJAMIN M. WATSON, OF JAMAICA PLAIN.

Professor of Entomology.
SAMUEL H. SCUDDER, OF CAMBRIDGE.

Delegate to the State Board of Agriculture.
E. W. WOOD, OF WEST NEWTON.

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*Communications to the Secretary, on the business of the Society, should be addressed him at Horticultural Hall, Boston.

Standing Committees.

Executive.

THE PRESIDENT, FRANCIS H. APPLETON, CHAIRMAN.
THE CHAIRMAN OF THE FINANCE COMMITTEE, H. H. HUNNEWELL, *Ex officio.*
WILLIAM C. STRONG. BENJAMIN C. CLARK.
WILLIAM H. SPOONER. WALTER HUNNEWELL.
NATHANIEL T. KIDDER. CHARLES W. PARKER.
CHARLES F. CURTIS.

Finance.

H. HOLLIS HUNNEWELL, OF BOSTON, CHAIRMAN.
FRANCIS H. APPLETON. AUGUSTUS HEMENWAY.

Lectures and Publication.

J. D. W. FRENCH, OF BOSTON, CHAIRMAN.
C. MINOT WELD. BENJAMIN M. WATSON.

Library.

WILLIAM E. ENDICOTT, OF CANTON, CHAIRMAN.
GEORGE W. HUMPHREY. WALTER S. PARKER.
EDWIN FAXON. GEORGE E. DAVENPORT.

Plants.

AZELL C. BOWDITCH, OF SOMERVILLE, CHAIRMAN.
JAMES COMLEY. JAMES WHEELER.
WILLIAM ROBINSON. WILLIAM J. MARTIN.

Flowers.

J. WOODWARD MANNING, JR., OF READING, CHAIRMAN.
MICHAEL H. NORTON. KENNETH FINLAYSON.
THOMAS C. THURLOW. FREDERICK S. DAVIS.

Fruits.

E. W. WOOD, OF WEST NEWTON, CHAIRMAN.
CHARLES F. CURTIS. WARREN FENNO. J. WILLARD HILL.
O. B. HADWEN. SAMUEL HARTWELL. SUMNER COOLIDGE.

Vegetables.

CHARLES N. BRACKETT, OF WATERTOWN, CHAIRMAN.
CEPHAS H. BRACKETT. VARNUM FROST. WALTER RUSSELL.
P. G. HANSON. WARREN H. HEUSTIS. AARON LOW.

Gardens.

JOHN G. BARKER, of Jamaica Plain, Chairman.

RMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND ARRANGEMENTS, *Ex officiis*.

RY W. WILSON. JACKSON DAWSON.

For Establishing Prizes.

WILLIAM J. STEWART, of Winchester, Chairman.

RMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis*.

MRS. P. D. RICHARDS.

Committee of Arrangements.

JOSEPH H. WOODFORD, of Boston, Chairman.

RMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis*.

ROBERT FARQUHAR.

MEMBERS FOR LIFE.

Members of the Society and all other persons who may know of deaths, changes in residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to members whose names are marked thus †.

Adams, Luther, Brighton.
Albro, Charles, Taunton.
Alger, Rev. R. F., Becket.
Allan, David, Boston.
Allen, Hon. Charles H., Lowell.
Ames, Frank M., Canton.
Ames, George, Boston.
Ames, Oakes, 2d, North Easton.
Ames, Preston Adams, Boston.
Amory, Charles, Boston.
Amory, Frederick, Boston.
Andrews, Charles L., Milton.
Andrews, Frank W., Washington, D. C.
Andros, Milton, San Francisco, Cal.
Appleton, Edward, Reading.
Appleton, Francis H., Peabody.
Appleton, William S., Boston.
Ash, John, Pomfret, Conn.
Atkins, Edwin F., Belmont.
Avery, Hon. Edward, Boston.
Ayling, Isaac, M. D., Brookline.

Bailey, Jason S., West Roxbury.
Bancroft, John C., Boston.
Banfield, Francis L., M. D., Worcester.
Barber, J. Wesley, Newton.
Barnard, James M., Malden.
Barnard, Robert M., Everett.
Barnes, Walter S., Somerville.
Barnes, William H., Boston.
†Barney, Levi C., Boston.
Barratt, James, East Pasadena, Cal.
Barrett, Edwin S., Concord.
Barry, William C., Rochester, N. Y.
Bartlett, Edmund, Newburyport.
Bates, Hon. Amos, Hingham.
Beal, Leander, Boston.
Becker, Frederick C., North Cambridge.
Beckford, Daniel R., Jr., Jamaica Plain.
Beebe, E. Pierson, Boston.
Beebe, Franklin H., Boston.
Beebe, J. Arthur, Boston.
Berry, James, Brookline.
Birchard, Charles, Framingham.
Black, James W., Cambridge.
Blake, Francis, Weston.
Blake, Frederick A., Rochdale.
Blakemore, John E., Roslindale.
Blanchard, John W., Dorchester.
Blaney, Henry, Salem.
Blinn, Richard D., Chicago, Ill.
Bliss, William, Boston.
Boardman, Samuel M., Milton.
Bocher, Prof. Ferdinand, Cambridge.
Bockus, Charles E., Dorchester.
Bosler, Frank C., Carlisle, Penn.
†Botume, John, Wyoming.
Bouvé, Thomas T., Boston.
Bowditch, Azell C., Somerville.
Bowditch, Charles P., Jamaica Plain.

ditch, James H., Brookline.
ditch, Nathaniel I., Framingham.
ditch, William E., Roxbury.
ker, William H., Boston.
kett, Cephas H., Brighton.
kett, Charles N., Watertown.
ee, Albert, Hubbardton, Vt.
er, Francis W., Hingham.
ham, William T., Honolulu, Hawaii.
mer, Martin, Boston.
ks, J. Henry, Milton.
n, Alfred S., Jamaica Plain.
n, Charles E., Yarmouth, N. S.
n, Edward J., Weston.
n, George Barnard, Brookline.
n, George Bruce, Framingham.
n, Jacob, Woburn.
n, John T., Newburyport.
ard, John R., Dedham.
ard, William S., Boston.
nett, Harry, Southborough.
, Fearing, Hingham.
, Matthew H., Hingham.
well, Edwin W., Brooklyn, N. Y.
well, Frank E., Brooklyn, N. Y.
er, Aaron, Wakefield.
er, Edward K., Jamaica Plain.

t, Edward C., Brookline.
lness, John, Flushing, N. Y.
s, William, South Boston.
er, Augustus P., Boston.
pbell, Francis, Cambridge.
en, John, Boston.
ton, Samuel A., Boston.
, Hon. John, Roxbury.
er, Charles N., Boston.
er, Miss Maria E., Woburn.
wright, George, Dedham.
dbourne, Marshall W., Mount Auburn.
ffin, John C., Newton.
mberlain, Chauncey W., Boston.
ase, Andrew J., Lynn.
se, Daniel E., Somerville.
se, George B., Boston.

Chase, William M., Everett.
Cheney, Mrs Elizabeth S., Wellesley.
Child, Francis J., Cambridge.
Childs, Nathaniel R., Boston.
Choate, Charles F., Southborough.
Christie, William, Newton.
Claflin, Hon. William, Newtonville.
Clapp, Edward B., Dorchester.
Clapp, James H., Dorchester.
Clapp, William C., Dorchester.
Clark, Benjamin C., Boston.
Clark, J. Warren, Rockville.
Clarke, Miss Cora H., Jamaica Plain.
Cleary, Lawrence, West Roxbury.
Clough, Micajah Pratt, Lynn.
Cobb, Albert A., Brookline.
Cobb, John C., Milton.
Coburn, Isaac E., Everett.
Codman, James M., Brookline.
Codman, Ogden, Lincoln.
Coffin, G. Winthrop, West Roxbury.
Collamore, Miss Helen, Boston.
Converse, Elisha S., Malden.
Converse, Parker L., Woburn.
Coolidge, Joshua, Mount Auburn.
Cottle, Henry C., Boston.
Cowing, Walter H., West Roxbury.
Cox, Thomas A., Dorchester.
Coy, Samuel I., Boston.
Crawford, Dr. Sarah M., Roxbury.
Crocker, Miss S. H., Boston.
Crosby, George E., West Medford.
†Crowell, Randall H., Chelsea.
Cummings, Hon. John, Woburn.
Curtis, Charles F., Jamaica Plain.
Curtis, George S., Jamaica Plain.
Cushing, Livingston, Weston.
Cushing, Robert M., Boston.

†Daggett, Henry C., Boston.
Damon, Samuel G., Arlington.
Dana, Charles B., Wellesley.
Davenport, Albert M., Watertown.
Davenport, Edward, Dorchester.
Davenport, George E., Medford.
Davenport, Henry, New York.

Davis, John, Lowell.
Dawson, Jackson, Jamaica Plain.
Day, William F., Roxbury.
Dee, Thomas W., Mount Auburn.
Denny, Clarence H., Boston.
Denton, Eben, Dorchester.
Dewson, Francis A., Newtonville.
Dexter, F. Gordon, Boston.
Dickerman, George H., Somerville.
Dike, Charles C., Stoneham.
Doliber, Thomas, Brookline.
Dorr, George, Dorchester.
Dove, George W. W., Andover.
Dowse, William B. H., West Newton.
Draper, Hon. Eben S., Hopedale.
Durant, William, Boston.
Durfee, George B., Fall River.
Dutcher, Frank J., Hopedale.

Eaton, Horace, Cambridge.
Edgar, William W., Waverly.
Eldredge, H. Fisher, Boston.
†Eldridge, E. H., Roxbury.
Eliot, Charles, Brookline.
Ellicott, Joseph P., Boston.
Elliot, Mrs. John W., Boston.
Elliott, William H., Brighton.
Endicott, William E., Canton.
Endicott, William, Jr., Boston.
Everett, William, Dorchester.
Ewell, Warren, Dorchester.

Fairchild, Charles, Boston.
Falconer, William, Pittsburgh, Pa.
Farlow, Lewis H., Newton.
Farquhar, James F. M., Roslindale.
Farquhar, John K. M. L., Roxbury.
Farquhar, Robert, Boston.
Faxon, John, Quincy.
Fewkes, Arthur H., Newton Highlands.
Finlayson, Kenneth, Brookline.
Fisher, David, Montvale.
Fisher, James, Roxbury.
†Fisher, Warren, Roxbury.
Flagg, Augustus, Boston.
Fletcher, George V., Belmont.
Fletcher, John W., Chelsea.
Fletcher, J. Henry, Belmont.
Flint, David B., Boston.
Forster, Edward J., M. D., Boston.
Foster, Francis C., Cambridge.
Fottler, John, Jr., Dorchester.
Fowle, George W., Jamaica Plain.
Fowle, William B., Auburndale.
French, Jonathan, Boston.
French, J. D. Williams, Boston.
French, S. Waldo, Jamaica Plain.
French, W. Clifford, Newton.
Frohock, Roscoe R., Malden.

Galloupe, Charles W., Swampscott.
Galvin, John, Boston.
Gardner, George A., Boston.
Gardner, George P., Boston.
†Gardner, Henry N., Mount Auburn.
Gardner, John L., Brookline.
Gibbs, Wolcott, M. D., Newport, R. I.
Gill, George B., Medford.
Gillard, William, Harrison Square, Dorchester.
Gilmore, E. W., North Easton.
Gilson, F. Howard, Reading.
Glover, Albert, Boston.
Glover, Joseph B., Boston.
Goddard, A. Warren, Brookline.
Goddard, Joseph, Sharon.
Goddard, Mrs. Mary T., Newton.
Goodell, L. W., Dwight.
Gorham, James L., Jamaica Plain.
†Gould, Samuel, Boston.
Gowing, Mrs. Clara E., Kendall Green.
Gray, James, Wellesley.
Gregory, Hon. James J. H., Marblehead.
Greig, George, Toronto, Ontario.
Grey, Benjamin, Malden.
Guild, J. Anson, Brookline.

Hadwen, Obadiah B., Worcester.
Hall, Edwin A., Cambridgeport.
Hall, George A., Chelsea.
Hall, George R., M. D., Warren, R. I.
Hall, Lewis, Cambridge.

Stephen A., Revere.
William F., Brookline.
lay, William H., South Boston.
nond, Gardiner G., New London, Conn.
nond, George W., Boston.
nond, Samuel, Boston.
on, P. G., Woburn.
ling, George W., Arlington.
ng, Louis B., Stamford, Conn.
, F. D., Cambridgeport.
s, Charles, Cambridge.
s, Thaddeus William, A. M., ene, N. H.
William T., Boston.
ood, George Fred, Newton.
ell, John C., Lynn.
ngs, Levi W., Brookline.
n, Mrs. C. S., North Cambridge.
n, Edward, Boston.
away, Seth W., Marblehead.
ken, Mrs. Thomas, Rockland, Maine.
eltine, Hazen, Boston.
enway, Augustus, Canton.
haw, Joseph P. B., Boston.
s, Albert H., North Cambridge.
wood, Hon. George, Concord.
burn, A. J., Boston.
John, Stoneham.
nger, Jacob, Mount Auburn.
, Samuel, Concord.
kins, John E., Portsmouth, N. H.
, Hon. Charles W., Nashua, N. H.
ngsworth, Amor L., Milton.
s, George W., Grantville.
s, John W., Allston.
nes, Edward J., Boston.
, Mrs. Stephen A., Winchester.
ner, Mrs. Charlotte N. S., Georgetown.
ford, Miss Kate, Cambridge.
ey, Charles H., Pasadena, Cal.
ey, Stillman S., Woburn.
bard, Charles T., Weston.

Hubbard, Gardiner G., Washington, D. C.
Hubbard, James C., Everett.
Humphrey, George W., Dedham.
Hunnewell, Arthur, Wellesley.
Hunnewell, Henry Sargent, Wellesley.
Hunnewell, H. Hollis, Wellesley.
Hunnewell, Walter, Wellesley.
Hunt, Dudley F., Reading.
Hunt, Francis W., Melrose.
†Hunt, Franklin, Boston.
Hunt, William H., Concord.
Hyde, James F. C., Newton Highlands.

Jack, John George, Jamaica Plain.
Jackson, Charles L., Cambridge.
Jackson, Robert T., Dorchester.
Janvrin, William S., Revere.
Jeffries, John, Boston.
Jenks, Charles W., Bedford.
Johnson, J. Frank, Boston.
Jose, Edwin H., Cambridgeport.
Joyce, Mrs. E. S., Medford.

Kakas, Edward, West Medford.
Kelly, George B., Jamaica Plain.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
†Kendall, Joseph R., San Francisco, Cal.
Kendall, Dr. Walter G., Atlantic.
Kendrick, Mrs. H. P., Allston.
Kennedy, George G., M.D., Roxbury.
Kent, John, Brookline.
†Keyes, E. W., Denver, Col.
Keyes, John M., Concord.
Kidder, Charles A., Southborough.
Kidder, Nathaniel T., Milton.
†Kimball, A. P., Boston.
King, Franklin, Dorchester.
Kingman, Abner A., Brookline.
Kingman, C. D., Middleborough.
Kinney, John M., Boston.
Knapp, Walter H., Newtonville.

Lancaster, Charles B., Newton.
Lawrence, Amory A., Boston.
Lawrence, Amos A., Boston.
Lawrence, James, Groton.
Lawrence, John, Groton.
Learned, Charles A., Arlington.
Lee, Charles J., Dorchester.
Lee, Daniel D., Jamaica Plain.
Lee, Henry, Boston.
Leeson, Hon. Joseph R., Newton Centre.
Lemme, Frederick, Charlestown.
Leuchars, Robert B., Boston.
Lewis, William G., Framingham.
Lincoln, George, Hingham.
Lincoln, Col. Solomon, Boston.
Little, James L., Brookline.
Lockwood, Rhodes, Boston.
Lodge, Richard W., Swampscott.
Loftus, John P., Dorchester.
Loring, Caleb W., Beverly Farms.
Lovett, George L., West Newton.
†Lowder, John, Watertown.
Lowell, Augustus, Boston.
Luke, Elijah H., Cambridgeport.
Lumb, William, Boston.
Lunt, William W., Hingham.
Lyman, George H., Wareham.
Lyman, Col. Theodore, Brookline.
Lyon, Henry, M. D., Charlestown.

†Mahoney, John, Boston.
Mallet, E. B., Jr., Freeport, Maine.
Mann, James F., Ipswich.
Manning, Jacob W., Reading.
Manning, Mrs. Lydia B., Reading.
Manning, Robert, Salem.
Manning, Warren H., Brookline.
Marshall, Frederick F., Chelsea.
Matthews, Nathan, Boston.
McCarty, Timothy, Providence, R. I.
McClure, John, Revere.
McWilliam, George, Whitinsville.
Melvin, James C., West Newton.
Merriam, Herbert, Weston.
Merriam, M. H., Lexington.
Merrifield, William T., Worcester.
Merrill, Hon. Moody, Roxbury.
Metivier, James, Cambridge.
Milmore, Mrs. Joseph, Washington, D. C.
Minton, James, Boston.
Mixter, George, Boston.
Monteith, David, Dedham.
Moore, John H., Concord.
†Morse, Samuel F., Boston.
Mudge, George A., Portsmouth, N. H.
Murphy, William Bowen, Boston.

Nevins, David, Framingham.
Newman, John R., Winchester.
Newton, Rev. William W., Pittsfield.
Nickerson, George A., Dedham.
Norton, Charles W., Allston.
Norton, Edward E., Boston.

Oakman, Hiram A., North Marshfield.
Olmsted, John Charles, Brookline.

Packer, Charles H., Boston.
Paige, Clifton H., Mattapan.
Paige, John C., Boston.
Palmer, Julius A., Jr., Boston.
Parker, Augustus, Roxbury.
Parker, Charles W., Boston.
Partridge, Horace, North Cambridge.
Paul, Alfred W., Dighton.
Peabody, Francis H., Boston.
Peabody, John E., Boston.
Peabody, Col. Oliver W., Milton.
Pearce, John, West Roxbury.
Peck, O. H., Denver, Col.
Peck, William G., Arlington.
Peirce, Silas, Boston.
Perkins, Edward N., Jamaica Plain.
†Perry, George W., Malden.
Philbrick, William D., Newton Centre.
Pierce, Dean, Brookline.
Pierce, George Francis, Dorchester.
Pierce, Henry L., Boston.
Poor, John R., Boston.

er, Herbert, Malden.
er, James C., Wollaston.
er, Joseph S., Fredericksburg, Va.
ıg, Louis, Roxbury.
t, Laban, Dorchester.
t, Lucius G., West Newton.
t, Robert M., Boston.
t, William, Winchester.
, Dr. Mark W., Boston.
escott, Eben C., Boston.
scott, William G., Quincy.
ıgle, Cyrus G., Charlotte, Vt.
ıty, Gardner, Littleton.
nam, Joshua H., Brookline.

nby, Hosea M., M. D., Worcester.

dlin, Everett W., North Cambridge.
d, Miss Elizabeth L., Newton Highlands.
d, Harry S., North Cambridge.
d, Oliver J., Cambridgeport.
rson, Warren W., Arlington.
, James F., Franklin.
, Hon. James P., Franklin.
, Hon. Joseph G., Franklin.
mond, Walter, Cambridgeport.
d, Charles A., Manchester.
rdon, John B., Boston.
d, George W., Boston.
e, George C., Worcester.
ıards, John J., Boston.
ıardson, Charles E., Cambridge.
n, J. Ph., Boston.
ley, Charles, Dorchester.
ley, Ebed L., Hingham Centre.
bins, I. Gilbert, Melrose Highlands.
ınson, John, Salem.
ınson, Joseph B., Allston.
ınson, Warren J, Somerville.
s, Henry, Newtonville.
s, Waldo O., Boston.
ldick, William H., M. D., South Boston.

Russell, George, Woburn.
Russell, Hon. John E., Leicester.
Russell, Walter, Arlington.

Salisbury, William C. G., Boston.
Sanford, Oliver S., Hyde Park.
Sargent, Charles S., Brookline.
Saville, Richard L., Brookline.
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
†Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, J. Montgomery, Boston.
Shaw, Christopher C., Milford, N. H.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Siebrecht, H. A., New Rochelle, N.Y.
Skinner, Francis, Boston.
Smith, Benjamin G., Cambridge.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Jamaica Plain.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco.
Smith, George O., Boston.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Snow, Miss Salome H., Brunswick, Me.
Spaulding, Edward, West Newton.
Spaulding, Hon. John P., Dorchester.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stewart, William J., Winchester.
Stone, Amos, Charlestown.
Stone, Charles W., Boston.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Sturgis, Russell, Manchester.
Sturtevant, E. Lewis, M. D., South Framingham.
Surette, Louis A., Concord.
Swain, Charles E., Roxbury.
Swett, Evarell F., Malden.

Taft, John B., Cambridge.
Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G., M. D., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Thompson, Leonard, Woburn.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Torrey, Everett, Charlestown.
Trepess, Samuel J., Brookline.
†Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Underwood, William J., Belmont.

Vander-Woerd, Charles, Waltham.
Vinal, Miss Mary L., Somerville.

Wainwright, William L., Braintree.
Wakefield, E. H., Cambridge.
Walcott, Henry P.,M.D.,Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Edward C. R., Roxbury.
Walker, Miss Mary S., Waltham.
Walley, Mrs. W. P., Boston.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Wardwell, William H., Brookline.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Washburn, Andrew, Hyde Park.
Waters, Dr. George F., Boston.
Watson, Benjamin M., Jamaica Plain.
Watson, Thomas A., East Braintree.
Watts, Isaac, Waverly.
Webber, Aaron D., Boston.
Weld, Christopher Minot, Jamaica Plain.
Weld, George W., Newport, R. I.
Weld, Richard H., Boston.
Weld, William G., Boston.
West, Mrs. Maria L., Neponset.
Weston, Leonard W., Lincoln.
Weston, Seth, Revere.
Wheeler, Frank, Concord.
Wheelwright, A. C., Brookline.
Whitcomb, William B., Medford.
White, Francis A., Brookline.
White, Joseph H., Brookline.
Whitney, Arthur E., Winchester.
Whitney, Ellerton P., Milton.
Whitten, Charles V., Dorchester.
Whittier, Hon. Charles, Roxbury.
Wilbur, George B., West Newton.
Wilder, Edward Baker, Dorchester.
Wilder, Henry A., Malden.
Willard, E. W., Newport, R. I.
Willcutt, Levi L., West Roxbury.
Williams, Aaron D., Boston.
Williams, Benjamin B., Boston.
Williams, Philander, Taunton.
Willis, George W., Chelsea.
Willis, Joshua C., Roxbury.
Wilson, Col. Henry W., Boston.
Wilson, William Power, Boston.
Winthrop, Robert C., Boston.
Wood, Luke H., Marlborough.
Wood, William K., West Newton.
Woods, Henry, Boston.
Wright, George C., West Acton.
Wyman, Oliver B., Shrewsbury.

ANNUAL MEMBERS.

nbers of the Society and all other persons who may know of deaths, ges of residence, or other circumstances showing that the following list ccurate in any particular, will confer a favor by promptly communi- g to the Secretary the needed corrections.

tt, Samuel L., M. D., Boston.
, Charles L., Floral Park, N.Y.
, William H., Hyde Park.
ld, Mrs. Anna E., Roxbury.
son, Edward, Brookline.

n, Augustus, Roxbury.
am, William H., Dorchester.
er, John G., Jamaica Plain.
d, Edward L., Cambridge.
dict, Washington G., Boston.
ow, Arthur J., Eastlake, Wor- ester.
ow, Mrs. Nancy J., South- borough
John L., Dorchester.
Mrs. Sarah Elizabeth, Roxbury.
, Benjamin K., East Bridge- vater.
, William A., North Cambridge.
s, Matthew, Boston.
s, William P., Roxbury.
en, Clarence F., Taunton.
k, Charles H., Newton.
k, Charles H. B., Brighton.
ks, George, Brookline.
n, David H., West Medford.
r, Edward, Wellesley.

ll, James T., Chelsea.
r, Mrs. Sarah D. J.. Wilming- on.
e, Joseph S., Malden.
e, Leverett M., Roxbury.
e, Philip A., Lynn.
ey, Amos P., Natick.

Chubbuck, Isaac Y., Roxbury.
Clapp, Henry L., Roxbury.
Clark, John Spencer, Boston.
Clark, Joseph, Manchester.
Clark, Theodore M., Newtonville.
Codman, Philip, Brookline.
Coleman, Mrs. S. H., Jamaica Plain.
Collins, Frank S., Malden.
Comley, James, Lexington.
Coolidge, David H., Jr., Boston.
Coolidge, Sumner, Mt. Auburn.
Cotter, Lawrence, Dorchester.
Councilman, Prof. W. T., Boston.
Crosby, J. Allen, Jamaica Plain.
Curtis, Joseph H., Boston.
Curtis, Louville, Tyngsborough.

Davis, Frederick, Boston.
Davis, Frederick S., West Roxbury.
Davis, Thomas M., Cambridgeport.
Dimick, Orlendo W., Watertown.
Dolbear, Mrs. Alice J., College Hill.
Doran, Enoch E., Brookline.
Doyle, William E., East Cambridge.
Duffley, Daniel, Brookline.

Eaton, Warren E., Reading.
Endicott, Miss Charlotte M., Canton.
Ewell, Marshall F., Marshfield Hills.

Faxon, Edwin, Jamaica Plain.
Felton, Arthur W., West Newton.
Fenno, Warren, Revere.
Fisher, Sewall, Framingham.
Fitzgerald, Desmond, Brookline.
Fletcher, Fred W., Auburndale.

Forbes, William H., Jamaica Plain.
French, Charles G., Utica, N. Y.
Frost, Artemas, Belmont.
Frost, George, West Newton.
Frost, Varnum, Arlington.
Fuller, T. Otis, Needham.

Gage, Alfred P., Arlington.
Gibbon, Mrs. James A., Brookline.
Gill, Mrs. E. M., Medford.
Grant, Charles E., Concord.
Grosvenor, Clarence E., Brooklyn, N. Y.

Haile, Hon. William H., Springfield.
Hall, Charles H., M. D., Boston.
Hall, Harry B., Dorchester.
Hall, Stacy, Boston.
Hall, William T., Revere.
Hargraves, William J., Jamaica Plain.
Harris, Miss Ellen M., Jamaica Plain.
Harris, Frederick L., Wellesley.
Hartwell, Samuel, Lincoln.
Hatfield, T. D., Wellesley.
Henshaw, Samuel, West Brighton, N. Y.
Hersey, Alfred H., Hingham.
Hersey, Edmund, Hingham.
Heustis, Warren H., Belmont.
Hewett, Miss Mary C., Canton.
Hill, Edwin S., Hyde Park.
Hill, J. Willard, Belmont.
Hobbs, George M., Boston.
Hollis, George, South Weymouth.
Horton, Herbert A., Brookline.
Houghton, George S., West Newton.
Hubbard, F. Tracey, Cambridge.
Hunt, Henry C., Newton.
Huston, Miss Katharine W., Roxbury.

James, Robert Kent, Dorchester.
Jameson, G. W., East Lexington.
Jordan, Hon. Jediah P., Roxbury.

Keith, Miss Mary R., Wollaston.
Kelley, Augustus H., Allston.
Kenrick, Miss Anna C., Newton.

Lancaster, Mrs. E. M., Roxbury.
Langmaid, Mrs. Mary, Somerville.
Lawrence, Henry S., Roxbury.
Lee, Francis H., Salem.
Lee, William W., Northampton.
Lomax, George H., Somerville.
Lombard, Richard T., Wayland.
Loring, Charles G., Boston.
Loring, John A., North Andover.
Lothrop, Thornton K., Boston.
Loud, Mrs. Mary E., Roxbury.
Low, Hon. Aaron, Hingham.
Lowell, John, Newton.

Manda, W. A., South Orange, N. J.
Manning, A. Chandler, Reading.
Manning, J. Woodward, Reading.
Markoe, George F. H., Roxbury.
Martin, William H., Dorchester.
Martin, William J., Milton.
Masten, Cornelius E., Roxbury.
May, F. W. G., Boston.
McDermott, Andrew, Roxbury.
McDowell, Mrs. Mary, Cambridge.
McLaren, Anthony, Forest Hills.
McMullen, Edgar, Boston.
Meredith, Albert A. H., Milton.
Meriam, Horatio C., D.M.D., Salem.
Merrill, John J., Roxbury.
Milman, William, Roxbury.
Munson, Prof. W. M., Orono, Me.

Newton, John F., Roxbury.
Nicholson, William, Framingham.
Norton, Michael H., Boston.
Norton, Patrick, Boston.

Olmsted, Frederick Law, Brookline.

Park, William D., Boston.
Park, William P., West Boxford.
Parker, John, Newtonville.
Parker, Walter S., Reading

erson, William, Quincy.
ce, George H., Concord.
rson, Ellis, Jr., Jamaica Plain.
emant, Robert, New York, N. Y.
xman, Dudley L., Boston.
tt, Thomas E., Winthrop.
pton, Willard P., West Newton.
er, Charles J., South Framingham
hard, Joseph V., Dorchester.
lie, George A., Wellesley Hills.
am, Charles A., Salem.

n, Miss Ruth G., Dorchester.
n, William E. C., Roxbury.
n, William P., Chelsea.
ards, Mrs. P. D., West Medford.
bins, Oliver R., Weston.
inson, Walter A., Arlington.
inson, William, North Easton.
s, Charles W., Newtonville.
s, Henry Wilson, Newtonville.
hwell, James E., Brookline.

nders, Miss Mary T., Salem.
tell, J. M., Fitchburg.
mitt, Georg A., Boston.
tt, Augustus E., Lexington.
dder, Samuel H., Cambridge.
ver, Edwin P., LL.D., Waban.
rples, Stephen P., Cambridge.
w, Hon. Edward P., Newburyport.
dd, Abraham B., Waltham.
ppard, Edwin, Lowell.
le, Dr. Daniel D., Chestnut Hill.
ith, Archibald, Somerville.
ther, Charles H., Jamaica Plain.
thworth, Edward, Quincy.
ire, Miss Esther A., North Cambridge.
arns, Mrs. Charles A., East Watertown.
arns, Charles H., Brookline.
vens, Miss Mary O., North Andover.
ne, Joshua C., Watertown.

Storer, Charles, Boston.
Story, Miss Sarah W., Allston.
Swan, Charles W., M. D., Boston.

Tailby, Joseph, Wellesley.
Talbot, Josiah W., Norwood.
Teele, William H., West Acton.
Terry, Rev. Calvin, North Weymouth.
Tobey, Rufus T., Roxbury.
Tobey, S. Edwin, Boston.
Travis, Charles B., Brighton.
Turner, Nathaniel W., Boston.
Tyndale, Theodore H., Brookline.

Vaughan, J. C., Chicago, Ill.

Warren, Samuel H., Weston.
Welch, Patrick, Dorchester.
Weld, Charles E., Roslindale.
Wells, Benjamin T., Newtonville.
Weston, Mrs. L. P., Danvers.
Westwood, Thomas H., Jamaica Plain.
Wheeler, James, Brookline.
White, Maurice P., Roxbury.
White, W. Henry, Lowell.
Whitney, Joseph, Cambridgeport.
Whiton, Hon. Starkes, Hingham Centre.
Wilcox, George D., M. D., Providence, R. I.
Wilmarth, Henry D., Jamaica Plain.
Wilson, B. Osgood, Watertown.
Winter, William C., Mansfield.
Wolcott, Mrs. Henrietta L. T., Dedham.
Wood, Mrs. Anna D., West Newton.
Wood, Elijah A., West Newton.
Wood, E. W., West Newton.
Woodford, Joseph H., Boston.
Woods, Henry F., Boston.
Worthington, Roland, Roxbury.

Young, Arthur W., Hingham.
Young, Charles S., Newton Centre.
Young, E. Bentley, Boston.

Zirngiebel, Denys, Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXII.

Life Members.

The payment of thirty dollars shall constitute a Life Membership, and exempt the member from all future assessments, and any annual member, having paid all dues, may become a Life Member by the payment of twenty dollars in addition thereto.

Annual Membership.

Every annual member, before he receives his diploma, or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIII.

Withdrawal or Discontinuance of Membership.

Any member may withdraw from the Society, on giving notice to the Treasurer and paying the amount due from him. Any member who shall neglect for the space of two years to pay his annual assessment, after due notice from the Treasurer, shall cease to be a member. The Treasurer shall give notice of such withdrawals or discontinuances to the Secretary, who shall erase such members' names from the list.

The attention of Annual Members is particularly called to Section XXIII.

HONORARY MEMBERS.

embers and correspondents of the Society and all other persons who may of deaths, changes of residence, or other circumstances showing that following list is inaccurate in any particular, will confer a favor by aptly communicating to the Secretary the needed corrections.
formation, or any clew to it, is especially desired in regard to Joseph well, *elected in* 1830, *and* George W. Smith, *elected in* 1851.

N. GEORGE S. BOUTWELL, Groton.
W. S. CLEVELAND, Chicago, Ill.
N. JOSEPH S. FAY, Wood's Holl.
EPH JEFFERSON, Buzzard's Bay.
JOR L. A. HUGUET-LATOUR, M. P., Montreal, Canada.
VARD WINSLOW LINCOLN, Secretary of the Worcester County Horticultural Society.
.. THEODORE LYMAN, Brookline.
EPH MAXWELL, Rio Janeiro, Brazil.
NALD G. MITCHELL, New Haven, Conn.
N. J. STERLING MORTON, Secretary of Agriculture, Washington, D. C.
ON R. VON OSTEN SACKEN, Heidelberg, Germany.
UEL B. PARSONS, Flushing, N. Y.
UEL R. PAYSON, Boston.
RGE W. SMITH, Boston.

CORRESPONDING MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly reporting to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Alexander Burton, *elected in* 1829, S. Reynolds, M. D., 1832, *and* Francis Summerest (or Summerer), 1833.

Édouard André, Editor in Chief of the Revue Horticole, Paris, France.

Professor L. H. Bailey, Cornell University, Ithaca, N. Y.

Charles Baltet, President de la Société Horticole, Vigneronne, et Forestière de l'Aube, Troyes, France.

Napoleon Baumann, Bolwiller, Alsace.

D. W. Beadle, 303 Crawford St., Toronto, Ontario.

Professor William J. Beal, Agricultural College, Michigan.

Prosper J. Berckmans, President of the American Pomological Society, Augusta, Ga.

Charles E. Bessey, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.

Dr. Ch. Bolle, Berlin, Prussia.

John Croumbie Brown, LL.D., Haddington, Scotland.

Professor J. L. Budd, Secretary of the Iowa Horticultural Society, Ames.

William Bull, Chelsea, England.

Alexander Burton, United States Consul at Cadiz, Spain, Philadelphia.

Isidor Bush, Bushberg, Jefferson Co., Mo.

George W. Campbell, President of the Ohio State Horticultural Society, Delaware, O.

Maxime Cornu, Director of the Jardin des Plantes, Paris, France.

Benjamin E. Cotting, M. D., Boston.

Daniel T. Curtis, Dorchester.

Rev. H. Honywood D'Ombrain, Westwell Vicarage, Ashford, Kent, England.

Robert Douglas, Waukegan, Ill.

Malcolm Dunn, Dalkeith, Scotland.

W. T. Thiselton Dyer, C.M.G., F.R.S., Director of the Royal Botanic Gardens, Kew, England.

ER EARLE, President of the American Horticultural Society, Cobden, Ill.
GE ELLWANGER, Rochester, N. Y.
T JOHN ELWES, F.L.S., F.Z.S., Colesborn, Andoversford, Gloucestershire, England.
IAM G. FARLOW, M. D., Professor of Cryptogamic Botany, Harvard University, Cambridge.
. FERNOW, Chief of the Division of Forestry, Department of Agriculture, Washington, D. C.
EW S. FULLER, Ridgewood, N. J.
ROBERT W. FURNAS, Ex-President of the Nebraska State Horticultural Society, Brownville.
RLES A. GOESSMANN, Ph.D., Director of the State Agricultural Experiment Station, Amherst.
RGE L. GOODALE, M. D., Professor of Botany, Harvard University, Cambridge.
DIAH B. HADWEN, Ex-President of the Worcester County Horticultural Society, Worcester.
FESSOR BYRON D. HALSTED, Botanist and Horticulturist at the New Jersey Agricultural Station, New Brunswick, N. J.
. HART, Superintendent of the Botanic Garden, Trinidad.
ERT HOGG, LL.D., Editor of the Journal of Horticulture, London.
. HOLDING, Ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.
S. REYNOLDS HOLE, Rochester, England.
JOSEPH HOOKER, K.C.S.I., The Camp, Sunningdale, England.
AH HOOPES, West Chester, Pa.
RGE HUSMANN, Napa, Cal.
LIAM J. JOHNSON, M.D., Fort Gaines, Ga.
RLES JOLY, Vice-President of the Société Nationale d'Horticulture de France, Paris.
GEORGE KING, Superintendent of the Royal Botanic Garden, Calcutta.
FESSOR WILLIAM R. LAZENBY, Secretary of the Agricultural Experiment Station, Columbus, O.
LEICHTLIN, Baden-Baden, Germany.
. B. LEIGHTON, President of the Norfolk Horticultural and Pomological Society, Norfolk, Va.
OR LEMOINE, Nancy, France.
INDEN, Ghent, Belgium.
. LYON, President of the Michigan Horticultural Society, South Haven.
P. MACOWAN, Director of the Botanic Garden, Cape Town, Africa.
MAXWELL T. MASTERS, Editor of the Gardeners' Chronicle, London.
RGE MAW, Benthal, Kinley, Surrey, England.
. MAXWELL, Geneva, N.Y.
MAS MEEHAN, Germantown, Pa.
CHARLES MOHR, Mobile, Ala.
DANIEL MORRIS, C.M.G., D.Sc., M.A., F.L.S., Assistant Director of the Royal Botanic Gardens, Kew, England.

CH. NAUDIN, Antibes, France.
GEORGE NICHOLSON, Curator of the Royal Botanic Gardens, Kew, England.
WILLIAM PAUL, Waltham Cross, London, N.
PROFESSOR D. P. PENHALLOW, Director of the Botanic Garden, Montreal, Canada.
HENRY PROBASCO, Cincinnati, O.
P. T. QUINN, Newark, N. J.
CAVALIÈRE ENRICO RAGUSA, Palermo, Sicily.
D. REDMOND, Ocean Springs, Miss.
S. REYNOLDS, M. D., Schenectady, N. Y.
WILLIAM ROBINSON, Editor of The Garden, London.
EDGAR SANDERS, Chicago, Ill.
WILLIAM SAUNDERS, Department of Agriculture, Washington, D. C.
WILLIAM R. SMITH, Curator of the Botanic Garden, Washington, D. C.
ROBERT W. STARR, Port William, N. S.
DR. JOSEPH STAYMAN, Leavenworth, Kan.
WILLIAM A. STILES, Editor of Garden and Forest, Deckertown, N. J.
WILLIAM SUMNER, Pomaria, S. C.
FRANCIS SUMMEREST.
WILLIAM TRELEASE, Director of the Missouri Botanic Garden, St. Louis.
DR. MELCHIOR TREUB, Director of the Botanic Garden, Buitenzorg, Java.
H. J. VEITCH, Chelsea, England.
HENRY L. DE VILMORIN, Secretary of the Société Nationale d'Agriculture de France, Paris.
ANTHONY WATERER, Knap Hill, near Woking, Surrey, England.

ERRATA.

In part I, page 135, line 17, for *rubra* read *Robur*, and in line 19, after *rubra*, insert "or the," so that the sentence shall read *Quercus Robur* is best for most of the oaks, although I believe the red oaks would do better on *Q. rubra* or the var. *tinctoria*.

CONTENTS.

PAGE.

BUSINESS MEETING, April 6. 1895; Memorial of John J. Thomas, pp. 179-181; Annual Report of the Plant Committee read, 181; Appropriation for Committee on Large, Old, or Otherwise Interesting Trees, 181; Amendments to the Constitution and By-Laws taken up, 181; Pillar to mark the spot of the discovery of the original Baldwin apple tree, 181; Four members elected, 181; Honorary Member elected, 182; Corresponding Member elected 182

BUSINESS MEETING, May 4; Three members elected, p. 182, Letter from Mrs. Mary H. Thomas acknowledging the memorial of John J. Thomas, 182; Letter from Prof. Byron D. Halsted acknowledging the receipt of his Diploma, 182; Invitation from W. J. Stewart, President, to the Gardeners' and Florists' Club, May 7 182

BUSINESS MEETING, June 1; Book presented from M. Charles Baltet . . 183

BUSINESS MEETING, July 6; Amendments to Constitution and By-Laws adopted 183

BUSINESS MEETING, August 3; Nominating Committee appointed, p. 183; Three members elected 184

BUSINESS MEETING, September 7; Report of the Nominating Committee, p. 184; Decease of Benjamin P. Cheney announced 184

BUSINESS MEETING, October 5; Annual Election, pp. 185, 187; Memorial to Benjamin P. Cheney, 185, 186; Additional appropriation for Flower Committee, 186; Six members elected, 186; Corresponding Member elected 186

BUSINESS MEETING, November 2; No quorum present 187

BUSINESS MEETING, December 7; Appropriations for Prizes and Gratuities for 1896, p. 187; Appropriation for Lectures and Publications, 188; Partial report of the Committee on Gardens read, 188; Further time granted for the Committee on Gardens, 188; Reports of the Committee on Fruits, Delegate to the State Board of Agriculture, Committee of Arrangements, Committee on Flowers, and Committee on Plants, read, 188; Twelve members elected, 188; Letters from Mrs. Elizabeth S. Cheney and Charles Baltet read 189

BUSINESS MEETING, December 21; No quorum present 189

REPORT OF THE COMMITTEE ON PLANTS; Introduction, pp. 190, 191; Spring Exhibition, 191; May Exhibition, 192; Rose and Strawberry Exhibition, 192, 193; Annual Exhibition, 193; Chrysanthemum Exhibition, 193, 194; Financial Statement, 194; Prizes and Gratuities awarded . 195-203

PAGE.

REPORT OF THE COMMITTEE ON FLOWERS; Introduction, pp. 204, 205; Spring Exhibition, 205, 206; May Exhibition, 206; Rhododendron Show, 206-208; Rose Show, 208-210; Annual Exhibition, 210; Chrysanthemum Show, 211; Financial Statement, 212; Prizes and Gratuities awarded 213-231

REPORT OF THE COMMITTEE ON FRUITS, pp. 232-234; Prizes and Gratuities awarded 235-251

REPORT OF THE COMMITTEE ON VEGETABLES, pp. 252-255; Prizes and Gratuities awarded 256-272

REPORT OF THE COMMITTEE ON GARDENS; Introduction, p. 273; S. C. Pratt's Strawberry Garden, 274; J. W. Manning's Herbaceous Garden, 274-281; Mrs. J. W. Clark's Estate, 281, 282; W. D. Hinds' Peach Orchard, 282-284; Statement of W. D. Hinds, 284, 285; Statement of A. J. Hinds, 285, 286; Forest Hills Cemetery, 286-292; Mrs. B. P. Cheney's Estate, 292,293; W. Nicholson's Chrysanthemum and Carnation Houses, 293-295; Awards 295, 296

REPORT OF THE COMMITTEE OF ARRANGEMENTS, ... 297-299

REPORT OF THE COMMITTEE ON SCHOOL GARDENS AND CHILDREN'S HERBARIUMS; Swan School Garden, Medford, pp. 300-303; George Putnam School Garden, Roxbury, 304-306; Children's Herbariums, 307-309; Prizes and Gratuities awarded 310, 311

REPORT OF THE DELEGATE TO THE MASSACHUSETTS STATE BOARD OF AGRICULTURE 312-316

REPORT TO THE STATE BOARD OF AGRICULTURE 317, 318

REPORT OF THE COMMITTEE ON THE LIBRARY, 319, 320; Note . . . 320

REPORT OF SECRETARY AND LIBRARIAN 321-324

REPORT OF TREASURER 325-330

REPORT OF THE FINANCE COMMITTEE 328

MOUNT AUBURN CEMETERY 331, 332

OFFICERS AND STANDING COMMITTEES FOR 1896 333-335

MEMBERS OF THE SOCIETY; Life, pp. 336-342; Annual, 343-345; Honorary, 347; Corresponding 348-350

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS 346

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1895.

PART III,

BEING THE LIST OF

ACCESSIONS TO THE LIBRARY

DURING THE YEAR.

BOSTON:
PRINTED FOR THE SOCIETY.
1897.

In accordance with the directions of the Committee on Lectures and Publication this list of Library Accessions is published in a separate pamphlet as Part III of the TRANSACTIONS for 1895.

LIBRARY ACCESSIONS, 1895.

In the following list the books purchased from the income of the Stickney Fund are marked S. F.; and those purchased from the Society's Appropriation for the Library, L. A. All others were received by donation and exchange, and the source whence received is given in every instance when known.

The measurements of the books are in inches and tenths of an inch, giving first the height, next the thickness, and lastly the width. When a pamphlet is less than one-tenth of an inch in thickness the place of that dimension is supplied by a dash.

GENERAL HORTICULTURE.

Amherst, The Hon. Alicia. A History of Gardening in England. Olive-green cloth, 10.2×1.4×7.1, pp. xvi, 398; 65 cuts. London: 1895. S. F.

Baltet, Charles. L'Horticulture dans les Cinq Parties du Monde. Half brown morocco, 10.×2.2×6.9, pp. xviii, (1), 776. Paris et Troyes: 1895. The Author.

Bon Jardinier Almanach, Le, pour l'année 1857, etc. Par Vilmorin, Poiteau, Louis Vilmorin, Decaisne, Naudin, Neumann et Pepin. Half calf, 6.8×2.8×5., pp. lxiv, 1568. Paris: n. d. Ulrich Holzer.

Garden Oracle and Floricultural Year Book, The. 1895. By the editor of "The Gardeners' Magazine." 37th year of publication. Half red cloth, 7.3×.7×5., pp. 274; 2 colored plates, cuts. London: (1895). S. F.

Horticultural Directory and Year Book for 1895. 36th year of publication. Blue paper, 7.×.9×4.8, pp. 496. London: (1895). S. F.

Clark, John T. C. The Amateurs' Guide and Flower-Garden Directory; . . . . to which is added the Vegetable Garden Manual. Faded plum-colored cloth, 8.2×.5×5.5, pp. 158; 15 cuts. Washington, D. C.: 1856. S. F.

(Lucas, Fielding, Jr.) The Practical American Gardener; etc. For every month in the year. By an Old Gardener. Full calf, 5.8×1.2×3.7, pp. xii, 424. Baltimore: 1819. S. F.

Miller, Philip, F. R. S. The Gardeners' Calendar; Directing what Works are necessary to be done every month in the Kitchen, Fruit, and Pleasure-Gardens, as also in the Conservatory and Nursery. Etc. Full calf, 7.9×1.3×5., pp. xviii, 352, (11); frontispiece. London: 1757. S. F.

Hanbury, Rev. William, A. M. A Complete Body of Planting and Gardening, etc., etc. 2 vols. Half Russia, 17.3×2.7×10.9. (I.) pp. iv, xx, 885; frontispiece and 12 plates. London: 1770. (II.) pp. 832, (24); frontispiece and 8 plates. London: 1771. S. F.

McIntosh, Charles, C. M. C. H. S. Flora and Pomona; or, The British Fruit and Flower Garden; containing descriptions of the most valuable and interesting Flowers and Fruits, cultivated in the Gardens of Great Britain, with figures drawn and colored from Nature. Etc. Boards, light-brown cloth back, 8.8×1.2×5.7; 71 colored plates (flowers 1–27, xxviii–xxxv and fruits i–xxxvi) with descriptive text and directions for painting. London: 1829. S. F.

Johnson, George W. The Principles of Practical Gardening. Brown cloth, 7.×.9×4.5, pp. (8), 343; cuts. London: 1845. S. F.

——— ——— —. The Gardener. Complete in twelve parts, forming three volumes. *Vol. I.* The Potato, Cucumber, Gooseberry, and the Grape Vine. pp. iv, 181, iv, 180, iv, 163, iv, 151; 1 colored plate, cuts. London: 1849. *Vol. II.* The Auricula, Asparagus, Pine-apple, and the Strawberry. pp. iv, 184, 133, 133, iv, 126; cuts. London: 1849. *Vol. III.* The Dahlia, Peach, and the Apple. pp. 111, 189, 149, iv, 130; cuts. London: 1849. 3 vols., green cloth, 6.8×1.6×4.3. S. F.

——— ——— —., *Editor.* The Cottage Gardeners' Dictionary. Describing the Plants, Fruits, and Vegetables desirable for the Garden, and explaining the terms and operations employed in their cultivation. Faded green cloth, 8.×2.1×5.1, pp. iv, 927; cuts. London: 1852. S. F.

Sutton and Sons, (Reading). The Culture of Vegetables and Flowers from Seeds and Roots. Also a year's work in the vegetable garden, flowers all the year round, the rotation and chemistry of crops, the formation of lawns from seed, and descriptions of and remedies for garden pests. Sixth Edition. Blue cloth, 8.8×1.4×5.8, pp. (1), 425; cuts. London: 1895. S. F.

Mottet, S. Guide élémentaire de Multiplication des Végétaux. Étude des différents moyens d'effectuer les semis, boutures, marcottes, greffes et divisions. (Bibliothèque d'Horticulture et de Jardinage.) Tan-colored cloth, 7.1×.5×4.6, pp. iii, 195; 85 cuts. Paris: 1895. S. F.

Horticultural and Agricultural Repository: containing important discoveries and improvements in Farming, Gardening, etc., etc. Faded-green cloth, 8.7×1.×5.4, pp. (9), 301. Lewes: n. d. S. F.

Lelong, B. M. Propagation. The Rearing of Citrus and Deciduous Trees from Seed. Budding, Grafting, and Appliances. Pamphlet, gray, 9.×.1×6., pp. 38; cuts, table. Sacramento: 1892. The Author.

Practical Gardening: being a series of Essays delivered by members and friends of the Devon and Exeter Gardeners' Mutual Improvement Association, during the Session 1891–2. Boards, light brown, blue

cloth back, 8.2×.2×5.5, pp. (4), 86. Exeter: [1893] Robert Veitch & Son.

Hayward, Joseph. An Inquiry into the Causes of the Fruitfulness and Barrenness of Plants and Trees. Arranged as a Dialogue. Dark green cloth, 7.×1.×4.5, pp. vi, (2), 292; cuts. London: 1834. S. F.

Williamson, William. The Horticultural Handbook and Exhibitors' Guide. A Treatise on cultivating, exhibiting, and judging plants, flowers, fruits and vegetables. Revised by Malcolm Dunn. New edition, enlarged. Light green cloth, 7.4×.9×5.2, pp. xxi, 248. Edinburgh and London: 1895. S. F.

Thompson, Colonel Halford, R. A., F. R. H. S. Plants without Earth, and How to Grow them in Jadoo Fibre. A Lecture given at People's Palace for East London. Pamphlet, 8.4×—×5.6, pp. 32; 2 cuts. London: 1895. L. A.

Wright, J., F. R. H. S. (Primer of) Horticulture. Ten lectures delivered for the Surrey County Council. Red cloth, 6.×.4×3.9, pp. 154; 37 cuts. London: 1893. S. F.

Gardener, The. A Magazine of Horticulture and Floriculture. (Vols. 1–16.) 1867-1882. Edited by William Thompson, Richard Dean and David Thompson. 16 vols., green cloth, 8.8×1.3-2.5×5.8, plates, cuts. Edinburgh and London: 1868–1882. L. A.

Rural Magazine, and Literary Evening Fire-side, The. Vol. 1, 1820. Half red leather, 8.8×1.5×5.8, pp. (4), 430. Philadelphia: 1820. [Only one volume published.] S. F.

Semi-Tropical California and Southern California Horticulturist. Vol. 5, No. 3. Los Angeles, Cal., March, 1892. Pamphlet, yellow, 11.7×—×9.2, pp. 265–280. C. R. Orcutt.

Semi-Tropical Planter, The. A Monthly Journal for the Farm, Garden and Fireside. *Vol. I, Nos. 1–8.* May to December, 1887. pp. 104; cuts. *Vol. II, No. 1.* January, 1888. pp. 20. *Vol. III, No. 1.* November, 1888. pp. 8. 9 pamphlets, blue, 12.1×—×9.3. C. R. Orcutt.

Horticulturist, The. No. 3. March, 1890. An Illustrated Monthly Journal of Literature, Science and Horticulture for the Rural Homes of Southern California. San Marcos, San Diego County, California. Pamphlet, tea, 10.8×—×7., pp. 8.

Great South-west, The. Vol. I, Nos. 1–7; Vol. II, Nos. 1–4 and 6–12; Vol. III, Nos. 1–3, and 5–12; Vol. IV, Nos. 1–5; Vol. V, Nos. 3 and 5–7. 38 pamphlets, 13.6×—×10.3. April, 1889 to July, 1893 C. R. Orcutt.

San Diego Magazine: California. New Series. Vol. I, Nos. 1–3. March-May, 1888. 3 pamphlets, yellow, 12.1×—×9.4, pp. 48. C. R. Orcutt.

Out of Doors for Women. Vol. II, Nos. 20 and 21. July and August, 1895. 2 pamphlets, 8.9×—×6., pp. 15, 16. Orcutt, Cal., and San Diego, Cal.: (1895). C. R. Orcutt.

Herendeen Manufacturing Co., Geneva, N.Y. Faultless Furman Boilers. Catalogue, etc. 19th edition. Pamphlet, buff, 7.1×.2×5.2, pp. 128; cuts.

Modern Greenhouse Heating. Steam and Hot Water Boilers, etc. 18th edition. Pamphlet, buff, 7.4×.1×5.4, pp. 46; cuts.

Home Warming and Ventilation. Etc. 4th edition. Pamphlet, blue, 7.2×.1×5.2, pp. 64; cuts. The Publishers.

Hitchings & Co., *Publishers.* Modern Greenhouse Construction. Pamphlet, green, 7.2×.2×9.8, pp. 64; cuts. The Publishers.

Greenhouse Heating and Ventilating Apparatus. (2d edition). Pamphlet, dark red, 9.7×.2×7., pp. 68; cuts. The Publishers.

Jones, Walter. Heating by Hot Water, (second edition), with information and suggestions on the best methods of heating public, private and horticultural buildings. Etc., etc. Maroon cloth, 7.5×.9×5.2, pp. 220; 96 cuts. London: 1894. S. F.

Beecher, Henry Ward. Plain and Pleasant Talk about Fruits, Flowers, and Farming. Black cloth, 7.5×1.4×5.4, pp. i–viii, 9–420. New York: 1859. S. F.

Johns, Rev. C. A., B. A., F. L. S., *Editor.* Gardening for Children. Seventh Thousand. Green cloth, 5.4×.5×4.5, pp. viii, 182, (2); frontispiece, cuts. London: [1849?] S. F.

Chamberlain, Mrs. T. (Edith L.), F. R. H. S. Town and Home Gardening. Gray cloth, 7.5×.8×5., pp. vi, (1), 160. London: 1893. S. F.

Robbins, Mary Caroline. The Rescue of an Old Place. Dark gray cloth, 7.2×1.1×5., pp. viii, 289. Boston and New York: 1892. Waldo O. Ross.

Ellwanger, George H. The Garden's Story or Pleasures and Trials of an Amateur Gardener. Half blue morocco, 6.5×.9×4.4, pp. vii, (1), 345; cuts. New York: 1889. S. F.

Also the second edition, light-green cloth, from Waldo O. Ross.

Thaxter, Celia. An Island Garden. With pictures and illuminations by Childe Hassam. Light-green linen, 9.3×1.×6.7, pp. ix, 126; frontispiece, 11 plates, etc. Boston and New York: 1895. S. F.

Cooper, Miss (Susan Fenimore). The Rhyme and Reason of Country Life: or, Selections from Fields Old and New. By the author of "Rural Hours," etc., etc. Plum-colored cloth, 7.6×1.3×5.4, pp. i–xii, 13–428; 17 plates, cuts. New York: 1855. S. F.

Ellacombe, Henry N., M.A., etc. In a Gloucestershire Garden. Dull red linen, 7.7×1.4×5.4, pp. (8), 302; 4 plates, 12 designs. London: 1895. S. F.

Austin, Alfred. The Garden that I Love. 3rd edition. Green linen, 8.3 ×1.×5.6, pp. vi, 168; cuts. London and New York: 1895. S. F.

"G. S. C." Gardens of Light and Shade. Green cloth, 10.×.7×7.6, pp. viii, (1), 70; 6 photographs, 1 plan, cuts. London: 1886. S. F.

Dyer, T. F. Thiselton. The Folk-Lore of Plants. Blue cloth, 7.7×3.3× 5.2, pp. (3), 328. London: 1889. Waldo O. Ross.

HORTICULTURAL SOCIETIES.

Rhode Island Horticultural Society. Semi-Centennial Year. 1895. Premium List. Pamphlet, 9.1×—×5.8, pp. (12). (Providence: 1895.) The Society.

—— —— —— ——. [Notice of] Exhibition of Carnations, March 20, 1895. 1 page. The Society.

Newport Horticultural Society. Chrysanthemum Exhibition and Floral Show, to be held at Newport, Rhode Island, October 30 and 31, and November 1, 1895. Sixth Annual Exhibition. Schedule of Premiums. Pamphlet, 9.×—×5.9, pp. (4). The Society.

New York Horticultural Society. Address read at the Anniversary Celebration, of the 28th of August, 1827. By H. N. Carter. Pamphlet, dark tea, 8.4×.1×5.4, pp. 22. New York: 1827. L. A.

Brooklyn Tree Planting and Fountain Society. Circulars 1–10. February 1894—November, 1895. 10 circulars, 11.×8.5.

Bulletin No. 1. Second Edition. July, 1894. Pamphlet, light blue, 9.×.3×5.7. pp. 63. Brooklyn: 1894.

Bulletin No. 2. Second Edition. February, 1895. Pamphlet, light blue, 8.9×.2×5.7, pp. 44; cuts. Brooklyn: 1895.

Diagram of Streets, with a list of trees suitable for planting in the streets of Brooklyn. 1 sheet, 10.×20.8.

Letter of L. Collins, Secretary, to B. E. Fernow, Chief, Division of Forestry, Washington, D. C., and reply, containing rated list of street trees for planting in Brooklyn. Circular, 10.9×8.5, pp. (3). Lewis Collins, Secretary.

Western New York Horticultural Society. Proceedings of the Fortieth Annual Meeting, held at Rochester, N. Y., January 23 and 24, 1895. Pamphlet, terra-cotta, 8.7×.2×5.9, pp. 174; 2 portraits, cuts. Rochester, N. Y.: 1895. John Hall, Secretary.

New Jersey State Horticultural Society. Proceedings at its Twentieth Annual Session, held at Trenton, N. J., January 2d and 3d, 1895. Pamphlet, gray, 8.8×.4×5.9, pp. 191; portrait, 1 plate. Mount Holly, N. J.: 1895. Henry I. Budd, Secretary.

Pennsylvania Horticultural Society. A Brief History. From its Organization, November 24, 1827, to July, 1895. Pamphlet, light blue, 7.5×—×5.4, pp. 10. D. D. L. Farson, Secretary.

—— —— ——. Premium List for 1895. Chrysanthemum Show and Horticultural Exhibition, commencing Tuesday, November fifth, continuing Wednesday, Thursday, Friday, and Saturday, at the Academy of Fine Arts, Philadelphia. Pamphlet, pale yellow, 9.×—×5.8, pp. 24; frontispiece, cuts. (Philadelphia: 1895.) D. D. L. Farson, Secretary.

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West Virginia State Horticultural Society. Report of First Meeting and Organization. [Contained in duplicate copy of Bulletin No. 8,

Vol. 4 (or Special Bulletin No. 2) of the West Virginia Experiment Station.] Pamphlet, terra-cotta, 9.1×.2×5.9, pp. 74–111 (Horticultural Report). Charleston: 1895. Prof. F. William Rane, Secretary.

North Carolina State Horticultural Society. Fourteenth Annual Report. 1894. By Gerald McCarthy, Secretary. Pamphlet, pink, 9.×.1×5.8, pp. 37. Raleigh: 1895. The Secretary.

Georgia State Horticultural Society. Proceedings of the Nineteenth Annual Meeting, held in the City of Cuthbert, July 31 and August 1 and 2, 1895. Pamphlet, light green, 8.9×.2×5.7, pp. 103; cuts. Augusta: 1895. George H. Miller, Secretary.

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Texas State Horticultural Society. Premium List offered by the citizens of Bowie, Texas, with Programme for the Ninth Annual Meeting and Fair to be held at Bowie, Texas, July 31st and August 1st and 2nd, 1895. Pamphlet, light brown, 8.5×—×5.8, pp. 15. Fort Worth, Texas: 1895. E. L. Huffman, Secretary.

Ohio State Horticultural Society. Twenty-eighth Annual Report, for the year 1894–5. Pamphlet, gray, 9.4×.5×6.7, pp. 322; 2 plates, cuts. Columbus, Ohio: 1895. W. W. Farnsworth, Secretary.

Columbus (Ohio) Horticultural Society. Annual Report. For the year ending December 31, 1894. Containing Constitution, List of Members and Quarterly Journal. Vol. 9. Prepared by Aug. D. Selby, Secretary. Dark-green cloth, 9.×.7×6., pp. viii, 180, (3); 7 plates, cuts. Columbus, O.: 1895. The Secretary.

Indiana Horticultural Society. Transactions for the year 1894, being a report of the Thirty-fourth Annual Meeting, held in the City of Indianapolis, November 7–9, 1894. Together with Reports of the Summer Meeting, held in New Amsterdam, August 22 and 23, and of Local Societies, Selected Papers, etc. By William H. Ragan, Secretary. Black cloth, 9.1×.5×6., pp. 173. Indianapolis: 1895. The Secretary.

Missouri State Horticultural Society. Thirty-seventh Annual Report. Meetings at Harrisonville, June 5, 6, 7, and Trenton, December 4, 5, 6, 1894. Dark-green cloth, 9.3×1.×6.1, pp. 393, v, iii; frontispiece, 3 plates. Jefferson City, Mo.: 1895. L. A. Goodman, Secretary.

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Colorado State Board of Horticulture. Semi-Annual Reports for the years 1893–1894. Vol. VII. Black cloth, 9.3×1.2×6.2, pp. 445; frontispiece, 1 portrait. Denver: 1894. The State Board of Horticulture.

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London, Horticultural Society of. Proceedings. From May, 1838, to December, 1843. Half green morocco, 9.5×1.1×6.3, pp. 442; cuts. London: 1844. S. F.

Royal Horticultural Society. Proceedings. Vols. 1–6 (covering the period from June 1, 1859 to January, 1869). 6 vols., half green morocco, 8.9–10.2×.6–1.8×6.5. London: 1861–(1869). S. F.

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Vol. XVII, Parts 3 and 4. April, 1895. pp. 71–140, cxliii–cclxx; cuts 20–34.

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[Also] Liste générale des Membres de la Société, Arrêtée au 1er Mars, 1894. (Supp. Jour. Soc. Nat. d'Hort. de France, Numéro d'Avril, 1895.) Pamphlet, green, 8.5×.3×5.4, pp. 157, (2). Paris: (1895). The Society.

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Sarthe, Société d'Horticulture de la. Bulletin. Tome XII.—1893, 4e trimestre; 1895, 1er trimestre. 2 pamphlets, salmon-color, 8.7X—X5.6, pp. 513–576. (Le Mans:) 1894, 1895. The Society.

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Société d'horticulture d'Orléans et du Loiret. Bulletin. 3e Série. Tome I. 1889 and 1890. 8 numbers. 6 pamphlets, blue, 9.8X.1–.5X6.5, pp. 470; 2 plates, cuts, etc. Orléans: 1889, 1890.

Tome II. 1891–1893. 12 numbers. Pamphlets, blue, 9.8X.1X6.4, pp. 544. Orléans: 1891–1893.

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Bulletin d'arboriculture, de floriculture et de culture potagère rédigé par Fr. Burvenich, Éd. Pynaert, Ém. Rodigas et Hub. Van Hulle. Organe du Cercle d'Arboriculture de Belgique. 6me Série, Vol. IV., 1895. 12 numbers. Pamphlets, gray, 9.2X.1X5.9, pp. 384; colored plates, cuts. Gand: 1895, The Editors.

Exposition Universelle de l'Hôtel et du Voyageur à Amsterdam, 1895. Section XIV.—Horticulture. Pamphlet, green, 8.3X—X5.4, pp. 8.

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Genève, Société d'Horticulture de. Bulletin. 40me Année. 1895. 12 pamphlets, pink, 9.5X—X6.2, pp. 192; cuts. Geneve: 1895. The Society.

R. Societa Toscana di Orticultura. Bullettino. Anno XX. 1895. (Vol. X della 2.a Serie.) 12 pamphlets, cream-color, 10.6X.1X7.2, pp.

376, and Index, 1886–95, pp. 57; 12 plates, colored and plain, 34 cuts. Firenze: 1895. The Society.

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Flower-Garden Display'd, The, In above Four Hundred Curious Representations of the most beautiful flowers; Regularly dispos'd in the respective months of their Blossom, etc., etc. The Second edition. To which is Added A Flower-Garden for Gentlemen and Ladies; etc., etc. Also The Method of raising Salleting, Cucumbers, Melons, etc., at any Time in the Year. As it is now practised by Sir Thomas More. Black leather, 9.9×1.×7.5, pp. (6), 139; 11 colored plates and colored title-page. London: 1734. S. F.

Doyle, Martin. The Flower-Garden, or monthly calendar of practical directions for the culture of flowers. First American Edition. Adapted to the climate of the United States, with notes and observations by L. D. Gale, M. D., etc. Faded pink cloth, 7.3×.7×5.8, pp. 180; 3 colored plates, 1 cut. New York: 1835. S. F.

Breck, Joseph. The Flower-Garden; or Breck's Book of Flowers; in which are described all the various hardy herbaceous perennials, annuals, shrubby plants, and evergreen trees, desirable for ornamental purposes, with directions for their cultivation. New edition, revised and enlarged. Black cloth, 7.7×1.3×5.4, pp. i–xii, 13–395. New York: 1858. S. F.

Bridgeman, T. The Florists' Guide, containing practical directions for the cultivation of annual, biennial and perennial flowering plants, of different classes, herbaceous and shrubby, bulbous, fibrous and tuberous-rooted; including the Double Dahlia; with a Monthly Calendar, containing instructions for the management of greenhouse plants throughout the year. Third Edition, enlarged and improved. Boards, yellow, faded green cloth back, 7.1×.5×4.6, pp. i–viii, 9–180. New York: 1840. S. F.

Also, a new and improved edition. Brown cloth, 7.7×.7×4.7, pp. 175; portrait. New York: 1895. S. F.

Casey, J. P. A Treatise on the Culture and Growth of different sorts of Flower Roots, and of Greenhouse Plants kept in rooms, etc. To which is added, a Table of the Linnean Classes of Botany, with their Orders and Examples. Full calf, 5.6×.3×3.6, pp. 99, (2). Baltimore: 1821. S. F.

Rose, N. Jönsson-. Window and Parlor Gardening. A Guide for the Selection, Propagation and Care of House-Plants. With illustrations by the Author. Light-green linen, 7.8×.6×5.4, pp. xi, 164; IV plates, cuts. New York: 1895. S. F.

Parsons, Samuel, Jr. Bedding Plants. [From Scribner's Magazine, March, 1895. pp. 329–337; 7 cuts.] J. D. W. French.

Stackhouse, S. Hardy Plants for Little Front Gardens. Boards, pale pink, 6.5×.5×4.2, pp. viii, 120. London: [1885?] S. F.

Correvon, Henry. Les Plantes Alpines et de Rocailles. Description — Culture — Acclimatation. (Bibliothèque d'Horticulture et de Jardinage.) Tan-colored cloth, 7.1×.6×4.5. pp. ii, 237, (2); 19 cuts. Paris: 1895. S. F.

Guihéneuf, D. Les Plantes Bulbeuses, Tuberculeuses et Rhizomateuses Ornementales de Serre et de Pleine Terre. Half green morocco, 7.8×1.6×4.9, pp. iv, 686 (2); 227 cuts. Paris: 1895. S. F.

D'Ombrain, Rev. H. Honywood, *Editor*. The Rosarian's Year-Book for 1895. Boards, gray, 7.×.3×5.4, pp. (7), 63; 1 portrait. London: 1895. S. F.

Melliar, Rev. A. Foster-, M. A. The Book of the Rose. Red linen, 8.×1.4×5.7, pp. xii, 236; frontispiece and 28 plates. London and New York: 1894. S. F.

Hibberd, Shirley. The Amateur's Rose Book, etc., etc. A New Edition revised by George Gordon. Olive-green cloth, 7.4×1.1×5.3, pp. (7), 294, (4); colored frontispiece, cuts. London: 1894. S. F.

Burnside, F. R. Tea Roses and How to Grow and Exhibit them. Brief Practical Hints for Beginners. Flexible covers, white, 5.9×.1×4.8, pp. 23. Hereford and London: 1893. S. F.

Christ, Dr. H. Le Genre Rosa. Résultats généraux des travaux de botanique systématique concernant ce genre. Traduit de l'allemand du Botanisches Centralblatt, 1884, Nos. 23, 26. Par Émile Burnat. Red cloth, 9.5×.4×6.4, pp. 56. Genève, Bale et Lyon: 1885. L.A.

Singer, Max. Dictionnaire des Roses, ou Guide général du Rosiériste. 2 vols. (A–L and M–Z.) Half wine-colored morocco, 7.2×1.5×5., pp. (2), 439; 364, 11, 10; 23 plates. Tournai: 1885. S. F.

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Veitch, James & Sons. A Manual of Orchidaceous Plants cultivated under glass in Great Britain. *Part IX.* Cymbidium, Zygopetalum, Lycaste, etc., etc. pp. 194; (6) plates, cuts. London: 1893. *Part X.* General Review of the Orchidaceæ. pp. viii, 9–160, iv, xii; (4) plates, 2 maps, cuts. London: 1894.
2 parts, gray paper, 10.×.6×6.1. S. F.

Warner, Robert, F.L.S., F.R.H.S., and Henry Williams, F.L.S., F.R.H.S. The Orchid Album, comprising figures and descriptions of new, rare, and beautiful Orchidaceous Plants. Vol. XI, parts 126–128. 3 parts, straw-colored paper, 12.5×.1×10., colored plates 501–512, and descriptive text. London: (1895?) S. F.

Sander, F. Reichenbachia.— Orchids illustrated and described. Second series. Vol. 2, part 12. pp. 107–114; plates 93–96. London: 1895? [Completion of the work.] Half green morocco, 21.6×2.×17.6 (the whole volume). S. F.

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January, 1895. pp. 29–53; colored plates 445–456. Brussels: 1894–5. *Vol. 9*, parts 49 and 50. February and March, 1895. pp. 1–20; colored plates 457–464. Brussels: 1895. Half green morocco, 14.2×1.4×11.4. S. F.

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Kerchove de Denterghem, Le Comte O. de. Le Livre des Orchidées. Half wine-colored morocco, 10.4×2.3×7.5, pp. viii, 601; 31 colored plates, 310 cuts. Gand et Paris: 1894. S. F.

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Measures, R. I. Cypripediums. [A List.] Third Edition. November, 1894. Blue calf, 2.7×.3×4.5, pp. 63, interleaved with blank leaves. S. F.

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Barker, Michael, Horticultural Department Cornell University, *Editor.* The American Chrysanthemum Annual. 1895. Boards, green, 9.9×.3×7.5, pp. (5), 44; frontispiece, 7 plates, 2 pages of portraits, cuts. Floral Park, N. Y.: (1895). S. F.

Jones, H. J. A Descriptive Catalogue of Chrysanthemums. Olive-green cloth, 8.6×.4×5.6, pp. 110; 13 plates. S. F.

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Sayers, E. A Treatise on the Culture of the Dahlia and Cactus. Boards, yellow, green-cloth back, 6.2×.3×3.7, pp. i–vi, 7–72. Boston: 1839. S. F.

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Mathews, F. Schuyler. Familiar Flowers of Field and Garden. Sage-green cloth, 7.6×1.×5.2, pp. vii, 308; frontispiece, cuts. New York: 1895. S. F.

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American Carnation Society. Proceedings of the Fourth Annual Meeting, held at Boston, February 21 and 22, 1895. Pamphlet, pale blue, 8.7×.2×5.7, pp. 78; 1 portrait. New York: (1895). Albert M. Herr, Secretary.

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Chrysanthemum Society, The National. Annual Report and Financial Statement. Schedule of Prizes for 1895. Pamphlet, pink, 8.3×.1×5.4, pp. 58. C. Harman Payne, Foreign Corresponding Secretary.

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Collins, Samuel. Paradise Retriev'd: Plainly and Fully Demonstrating the most Beautiful, Durable, and Beneficial Method of Managing and Improving Fruit-Trees against Walls, or in Hedges, contrary to Mr. Lawrence, and others, upon Gardening. Together with a Treatise on Mellons and Cucumbers. Salmon-colored paper, 7.×.3 ×4.6, pp. v, (7), 5–106; 2 plates. London: 1717. S. F.

Switzer, Stephen. The Practical Fruit-Gardener. Being the Newest and Best Method of Raising, Planting, and Pruning, all sorts of Fruit-Trees, etc., etc. The Second Edition, etc. Half calf, 7.9×1.3×5., pp. (32), 363, (13); 5 plates. London: 1763. S. F.

Brookshaw, George. The Horticultural Repository, containing delineations of the best varieties of the different species of English Fruits; etc., etc. 2 vols. Half calf, 9.7×1.×6.1, pp. 1–96 and 97–199; colored plates 1–50 and 51–104. London: 1823. S. F.

Thacher, James, M. D. The American Orchardist; or a practical treatise on the culture and management of Apple and other fruit trees, etc., etc. Calf, 8.6×.8×5.3, pp. 226. Boston: 1822. S. F.

Sayers, E. The American Fruit Garden Companion, being a practical treatise on the propagation and culture of fruit, adapted to the northern and middle states. Maroon cloth, 7.×.6×4.5, pp. 174. Boston: 1839. S. F.

Kenrick, William. The New American Orchardist; or, an account of the most valuable varieties of Fruit, of all climates, adapted to cultivation in the United States; etc., etc. Seventh Edition, Enlarged and Improved. With a supplement. Dark-blue cloth, 7.6×1.1×5., pp. 450. Boston: 1844. S. F.

Manning, Robert. The New England Fruit Book. Being a descriptive catalogue of the most valuable varieties of the Pear, Apple, Peach, Plum, and Cherry, for New England Culture. Etc., etc. Second edition, enlarged. By John M. Ives. Black cloth, 7.5×.4×5., pp. (7), 133; 1 colored plate, cuts. Salem and Boston: 1844. S. F.

Bennett, J. M., F. L. S. A Selection of Rare and Curious Fruits Indigenous to Ceylon, from drawings made in the Island and colored from Nature. Pamphlet, green, 12.×—×9.7, 3 colored plates with descriptive text. London: n. d. [1840?] L. A.

(Rumford Historical Association.) Photograph of pillar "erected in 1895 by the Rumford Historical Association, where in 1793 Sam'l Thompson, Esq., while locating the line of the Middlesex Canal discovered the first Pecker Apple Tree, later named Baldwin." Photograph, 12.×10. Leonard Thompson.

Abbildung von 51 Pfirsich Gattungen nach der natur. 1821. pp. (4), 20. Wien: (1821). [Followed by the same in Hungarian pp. (2), 22, (2). Bétsben: (1821).] Half dark-green cloth, 17.4×.9× 11.8, frontispiece and 50 colored plates. S. F.

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Mitzky, C., & Co., *Publishers.* Our Native Grape. Grapes and Their Culture, also Descriptive List of Old and New Varieties. Green cloth, 9.5×.5×6.4, pp. 218, (1); 8 colored plates, cuts. Rochester, N. Y.: 1893. S. F.

Thiebaut de Berneaud, ——. The Vine-Dresser's Theoretical and Practical Manual, or the art of cultivating the Vine; and making Wine, Brandy and Vinegar. Etc., etc. From the second French Edition, by the Translator of Le Solitaire, Le Notti Romane, etc. Half faded-green cloth, 9.4×.6×6., pp. 158, iiii; 1 plate. New York: 1829. S. F.

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Fisher, S. I. Observations on the Character and Culture of the European Vine, during a residence of five years in the Vine Growing Districts of France, Italy and Switzerland. To which is added the Manual of the Swiss Vigneron, as adopted and recommended by the Agricultural Societies of Geneva and Berne. By Mons. Brun Chappuis. And the Art of Wine Making, by Mons. Bulos, Member of the Institute of France. Translated from the French. Green cloth, 7.4×.8×4.5, pp. vii, 13–244. Philadelphia: 1834. S. F.

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1896.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1896.

The following papers and discussions have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the "Boston Transcript." As here presented, the papers are printed in full, and the discussions are not only much fuller than in the weekly reports, but, where it appeared necessary, have been carefully revised by the speakers.

The Committee on Publication and Discussion take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature in the papers and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

J. D. W. French,
C. Minot Weld,
B. M. Watson,
Committee on Publication and Discussion.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 4, 1896.

A duly notified stated meeting of the Society was holden at eleven o'clock, the chair being taken by President NATHANIEL T. KIDDER.

This being the commencement of the term of office of the new board of officers and Committees, the retiring President, with appropriate remarks, introduced the President-elect, FRANCIS H. APPLETON, who delivered the usual inaugural address, as follows:

ADDRESS OF PRESIDENT APPLETON.

Fellow-Members of the Massachusetts Horticultural Society:

Twenty-five years ago this year I was sufficiently inoculated with the germ of fondness for, and in interest in, those branches of horticulture which are, in varied form, the charge and care of this Society under legislative assignment, to request that my name be presented for Life Membership, and I feel that had I been called upon to pay fifty dollars, instead of thirty dollars, for my Certificate it would not have been too much.

The possibilities for helpfulness to the individual who is interested in horticulture, and usefulness to horticulture in general, of this Society, are great — indeed much greater than is possible in this present building.

I feel that, in the several branches represented by our Committees, our Society can do more than is now possible, or is now our custom to do, to enlarge and advance the sphere of the

scientific and practical usefulness to, and the market possibilities for, our horticulturists.

Under the law, our property must be used strictly for the advancement of horticulture, and for that object must our income and real estate be directed. To that end are our special Committees on Plants, Flowers, Fruits, Vegetables, and Gardens chosen from those of our members who are best able to conduct such duties; and so are the members of the other Committees chosen for their fitness to carefully conduct the duties assigned to them.

Each Committee is wisely limited in the scope of its duties and it is to them, in their several lines, that the Society must look for suggestions as to improvement, which must be subject to review from a financial standpoint. Income is always limited.

I believe, under like reasoning, that the interests of every member of the Society would be promoted by having the Real Estate and other invested property of the Society placed in the hands of a carefully constituted Board of Trustees.

After my twenty-five years of membership, somewhat actively passed upon several of our Committees, and after a quite general interchange of opinions among our members, I feel convinced of the value to horticultural interests in the State of the adoption of the foregoing proposed plan.

I venture to express the hope that you will be prepared to favor such a proposition, if it shall be presented to you later in wise form.

As proof of the indirect benefits from our work in various ways let me relate the following:

Not very long ago I visited certain Rose houses in the neighborhood of Boston, which covered several acres with glass, and whence I had known that all the product of roses had been shipped to New York. I asked the superintendent if New York continued to be their market. "Oh, no," said he; "all our roses now find ready sale in Boston." And I learned that, in his opinion, the Exhibitions of our Horticultural Society had accomplished so much towards building up in Boston an increased taste, and increased demand, for well-grown flowers, that the change of market had been thus brought about.

Look over the list of our members, and you find but few who have not contributed somewhat to horticultural work.

It is to this Society's encouragement, and to the work of its members, that our citizens are largely indebted for the beautiful suburban landscape that is made up of the homes of our wealthy and prosperous people. That encouragement and good work extends beyond the limits of Boston's suburbs.

The horticultural work undertaken by our municipalities throughout our State has also been stimulated and advanced by the example set by distinguished members of our Society, and others like them, whose beautiful grounds stand as object lessons in all branches of such work.

To show how horticultural tastes may be promoted, pardon my being a bit personal. My early days were passed in the city of Salem, where a home was incomplete without such a surrounding garden as the experience of most of you can readily picture, with its fruits and flowers, paths and hedges; and there a phase of horticultural liking was promoted.

Later, a change of home to the neighboring country gave fields and pastures, with natural growths of trees, shrubs, and native flora, with all the living accompaniments that interest, and benefit or torment; all of which gave opportunity that has developed another phase of horticultural taste.

With such varied surroundings, could tastes, other than those that are framed with horticultural likings, be expected, even though they are moderate in degree.

Thus are individuals encouraged, in part, to aid in advancing the work that our Society promotes.

How can any one, living in these days and knowing of the incorporated "Board of Trustees of Public Reservations," with their right to hold any land within the limits of, and in trust for, the State; also any one having a knowledge of the Metropolitan Park Commission, with its right to take and hold lands within that territory, whose life comes from the profits of business transactions largely consummated in that section of Metropolitan Boston which can be called "the City," and any one having a knowledge of the Boston Park Commission, which has constructed and developed a system of connected Public Park lands, from which the Metropolitan Park lands, and certain of the Public Reservations, are to become readily accessible, — how can any such person, if he has traveled, not agree that there is no city anywhere, especially on a seacoast, and on the banks of

two naturally beautiful rivers, with attractive streams and lakes, with hills and forests within and near her borders, that approaches the Boston of the near future in horticultural and landscape conditions?

The surroundings of these Parks offer limitless opportunities for landscape effect, and other horticultural work. The degree of beauty that shall result therefrom must be gauged by the skill and knowledge of those who have the moulding of such opportunities into realities.

Our lectures can in part be directed towards the preservation of high ideals in that direction, to good advantage.

Good taste in all our horticultural work should be encouraged, to prevent bad taste.

The market gardens in the neighborhood of this city, and elsewhere, whence we receive the fine specimens of produce that decorate our tables, are generally models of the application of science and business methods, to the work that is there conducted. Therein they set an example which our agriculturists can always adopt to their profit.

Business method means all possible economy; and application of science means prevention of waste, and increase of profit; all are essential to success whether in horticulture or farming. Herein is shown a field for usefulness of Experiment Stations and kindred establishments, but they will not always meet our needs unless our needs are made known to those who direct them, to guide their course of investigation.

The Winter Meeting of our State Board of Agriculture, and the numerous meetings that are conducted throughout the State with the Board's aid during the year, draw out the needs of agriculture, and attempt to meet them with wise advice.

As that State Board is constituted to perform educational work that shall benefit our horticultural and farming interests, it seems fitting that our Representative upon that Board should report on the beneficial work of said Board, as is done this year.

State and Nation are liberal to an extreme degree in our interest, and the money that is appropriated needs to be judiciously used and the results wisely disseminated in the cause of horticulture and farming to ensure its continuance to our stations and agricultural colleges.

This Society was organized March 17, 1829, and its Act of

Incorporation was signed by the Governor on the 12th of June. When its members assembled in the "Society's Room," which was termed convenient and spacious, over the counting-room of the "New England Farmer," at 52 North Market street, little did they dream that, sixty-seven years later, the same Society would be established here, as complete owner of this valuable location, which is almost surrounded by daylight. Nor did they suppose that this Society would exist to see the day when it had outgrown the arrangements which were made for it by their successors upon this site only thirty years ago.

We are probably all alive to our present deficiencies, but wisdom and good judgment have led your chosen officers to be cautious in studying our needs, and in advising plans for action.

When your officers are prepared to present plans to you for improvements in our Society's home that in their judgment will make the administration of the Society's chartered work easier and more effective, I bespeak for them your favorable consideration.

This city has made remarkable advances since this building was erected in 1865. The district devoted to business and trade has been greatly extended, and the centres of literary and social activity have greatly changed. The increase of population and valuation, the construction of our park systems, our improved methods of land transportation, and the spreading out of the people to whom Boston is their source of income, over an extended metropolitan area, make the conditions under which this Society is called on to do its work bear a changed and important proportion to the wonderful development of Boston.

From the Town of the days of the founders of this Society, with its cows pastured on the Common, and only two malls then constructed there, what advances have been made are evidenced by the beautiful trees that are growing upon that Common today, and the fact that our Common and its neighbor, the Public Garden, together, offer a problem to the landscape architect and engineer, upon the wise solution of which may depend the preservation of its beauty and usefulness to future generations. As an open-air space for the refreshment and promotion of the health of our citizens it must forever remain.

Something must soon be done to enable our Society to keep pace with the changed conditions that surround us.

Upon this valuable location, I have said, we have a building ill adapted to our needs. Our Exhibitions cannot be seen to good advantage on account of the necessarily crowded condition of what can be exhibited, in the lines of plants and flowers especially; and many of the larger plants that should be shown, could they be readily brought into position, *now* never reach our halls on account of, not only the great difficulty in carrying them into position up two flights of stairs (our elevator service being necessarily cramped), but also of the greater risk and probability of injury from having to carry many of them up in an inclined position.

Even in the case of the lighter exhibits, which can be easily carried to the tables, those who visit the show are too often inconvenienced, as is also the case with the plants and flowers, by the narrowness of the aisles. It is frequently the case that the usefulness of an exhibit is much lessened from the fact that there is insufficient room for the interested group to discuss it. Under such conditions today those visitors who have come to see and learn, but are not expert growers, meet with inconvenience and a degree of discouragement that is undesirable.

The accommodations for our volunteer Committees, upon whose careful decisions much always depends, could well be made better, and enable them to have improved opportunities to discuss the merits of the several exhibits before concluding their awards. Committee rooms are needed, and a room for the Treasurer and Superintendent of the Building is desirable. In such rooms the Executive, Finance, Library, and Lecture and Publication Committees would find convenient quarters for meetings that would relieve the Library, and be useful as anterooms when our halls were let for evening or other uses.

Such rooms should be under the control and assignment of the Superintendent of the Building.

With two flights of stairs for visitors to mount to enjoy more than half of our larger, beautiful Exhibitions, and a third flight to climb in order to secure one of those exquisite bird's-eye views, made more beautiful by the electric lights, in the Upper Hall, many would-be visitors are kept from our shows on account of age, or inability to mount our stairs. Our treasury suffers in

consequence of such inconvenience, and the cheering influence that might be imparted to many whose lives are confined to a city home is lost.

I would not call to your attention so publicly our deficiencies, as they appear to me, did I believe there was any chance of further detracting from the attendance in these quarters, but I consider that such detraction has been already discounted, and that the treasury has already suffered from these causes.

A most valuable asset towards promoting the objects for which we are a chartered institution is the Library. My intimate connection with this department, as a member of its Committee for a number of years, has enabled me to see that its value is great for our purpose; but the opportunities for using it and distributing its usefulness, bear too small a proportion to its value.

Its books are accumulating without shelf room to receive them, and are so filling up the floor and tables of the library and reading-room, and also the vacant space on the shelves behind the regularly shelved books, that the discouragements to use the library room are thus very great.

For some reason, not quite clear, the heating apparatus seems to be beyond control in the library rooms in the colder season, and the high temperature is complained of by members.

To accomplish the best results a reading-room should not be occupied by others than those having the delivery of its books in charge, while the reading-room and stack-room are combined, and be otherwise exclusively for readers. Where possible, a reading-room should be separate from the stack-room; but this is more than we should expect.

I feel that it is in the interest of advance in horticulture, so far as our Library can assist, that the minimum of work should be done in our reading-room, as at present constituted.

The shelves are now overflowing with books, and I will suggest that it may be a waste of money to attempt to improve the Library accommodation in this location.

To be of most use, our awards of prizes should be issued soon after the awards are made; and the effectiveness of the essays delivered is increased by early publication, when the Committee decide to print them.

Lists of Library acquisitions are always hung upon our walls, and they, with the corrected list of members, can well wait until

the Secretary can issue them, which is not always possible until after considerable correspondence. Our publications should not be delayed for these two latter. The Secretary is required to keep copies of correspondence, but the custom of copying by hand can well be replaced by the use of the letter-press, and meet the constitutional requirement. The adoption of the modern method of shorthand and typewriting, by an assistant, would seem to promote both correspondence and copying, and leave more time for other necessary work.

The Librarian controls the Library under the Library Committee, and all directions should go through him as to all Library matters, in the same manner as is the case of our Superintendent controlling the building under the Finance Committee.

I believe that a system of Bulletins in place of our Transactions might be found more beneficial; and these could be placed upon our tables, or mailed to those who should have requested that such be done. There would then be no unreasonable delay in having useful information reach our horticulturists in good season.

I ask the Committee on that subject to consider even a further reduction of the number of lectures, if that will secure the presentation of all in better form for the printer, from a financial standpoint. It has been suggested to me that semi-monthly lectures might be desirable. I consider that the Committee have full power to establish the number of lectures, and publish such as they may select, whether they shall be issued in Bulletin form or in the present form of Transactions.

I believe that it has been in past years a custom with the Society to offer prizes for Essays upon subjects to be given by the Committee, and such a method is named in our Constitution. A change to that form of securing lectures might prove of value, by promoting increased interest.

I submit these thoughts for consideration by the appropriate Committee.

The safety of our Library now lies in insurance, and not in the building which houses it. No library of such value as ours now possesses, could have been deemed possible when this building was erected; if it had, the library room would probably have been constructed in 1865 in a manner different from a purely commercial building.

It is supposed that the contents of a purely commercial building can be replaced in case of loss with the money received from insurance. But such is not possible with many of the books in a valuable library such as is ours, which ranks very high, if not first of its kind.

We are dependent for rental, above our first story, in this valuable location, from our halls when they are not required for our regular exhibitions or lectures.

In these we are greatly handicapped for two chief reasons. First of these is, that we have not suitable toilet and dressing rooms to make the halls as desirable as they should be for the best-paying uses, or, indeed, for any demands such as are in keeping with modern requirements.

Second of these is, that by reserving our lower hall for our lectures on Saturdays, in January, February, and March, it is impossible to accommodate a certain class of applicants for its use, whose best receipts come by renting for a complete week, especially in the middle of the winter season.

I present this phase to show that the ownership of so much space devoted to halls, such as are ours in this location, is unwise, with the adaptability to our needs so poor.

During the past and previous years, several plans have been considered by your chosen Committee, which were presented to them with a view to improving the accommodations for our chartered work, and which were estimated to yield fair revenue to promote that work.

The alteration of the present building has been considered, but it appears that such action can only change the conditions, and better them but little, if at all. If changes are to be made, they should include radical and advanced improvements.

A leading firm of architects, and a competent real-estate firm, upon request, freely submitted a plan for an entirely new fireproof building upon this site, of the extreme height allowed by law, which would reserve the two upper stories for one hall (for all but our largest exhibitions), a two-story library and reading-room, with committee rooms separated by folding doors which would allow of their being thrown into one; and afford other needed accommodations. The financial showing upon this plan appeared quite favorable to the Society when made. The balance

of the building was planned to contain rentable stores and offices, with good elevators.

Such a plan contemplated hiring a larger hall, or erecting a large tent, in the warmer season, for the larger exhibitions. It has been suggested that an exhibition in such a tent at Franklin Park, or in one of the new buildings being erected there, might be wise, if well advertised.

Another firm of architects submitted a sketch for a building suited to a new, proposed site, if our present property could, in the opinion of our Committee, be sold advantageously, and a wise purchase of land could be made elsewhere. Several locations were suggested, and considered in this connection.

Conferences were also held with leading city officials, to ascertain whether it was likely that the city would favor this Society in selecting a new site in connection with the Park systems, or elsewhere, in view of the importance of its work to public interest. There are possibilities in this direction.

I am told that in Philadelphia a new and ample Horticultural Hall, and anterooms, is either planned, or completed, that is handsome and convenient for its exhibitions, and for large assemblies. This is located in the heart of the city, and readily accessible by street-cars, carriages, or on foot.

I have deemed it wise to present to you these facts and suggestions in advance of that time (soon, I hope) when your Committee will find it wise to present to you recommendations. It is fair that you should not be led by the idea that your Committee has been inactive, for the members who compose it have been mindful of the Society's interests and chartered duties.

The subject is still under consideration, and your Committee can be trusted to act with wisdom and with discretion.

Before concluding with a summary of suggestions, in brief, I wish to commend the volunteer work in the promotion of our duties by so many of our members. It is by no means only those who so freely give of their time to act for the Society, so usefully, in this building, and who deserve much credit for assisting in making our meetings possible; but also the many other members, who constitute our useful and reserve force, who, at their homes and by their influence, contribute largely to make the Society's influence felt for good.

I would commend the subject of useful and injurious birds, useful and injurious insects, the value of water in connection with the fertility of our soils, the general subject of Botany, the usefulness of books on these subjects in our schools as cultivating the powers of observation, and the value of appropriately planted school yards, and home windows — all these, as worthy of promotion by the Society.

All these subjects are greatly promoted by volunteer work.

It is wise to make known to our members, and the public, methods to prevent the spread of all injurious pests, and which will cause their destruction, so that such injuries shall not be allowed to multiply to such an extent as to become in any case public nuisances.

Intelligence of the individual should prevent the necessity of calling for Government aid, by not allowing extreme cases to exist.

Our Experiment Stations are established to help in this direction, and are now well equipped. They have issued carefully prepared Bulletins for this purpose, and it is extraordinary how little heed is too often paid to the valuable advice contained therein. Even this city has not been exempt from this criticism lately.

Let us remember the true motto, that prevention is always better than cure.

Should it be decided to sell our building, we should endeavor to secure as convenient a location as possible, that we can grow up to, and where our hall shall be made accessible for the largest plants possible of exhibition, with convenient anterooms for our purpose, with fire-proof, and suitable, enclosure for, and that shall encourage the use of, our valuable library.

If we cannot soon find a way to wisely change, or radically improve, these quarters, I would advise a careful consideration of the removal of our library to a safe place of storage until accommodations are constructed in which it will be reasonably protected from fire.

The use of modern methods and conveniences in the conduct of our work, that shall make its usefulness effective, without unnecessary delay, should be adopted when such can be reasonably done.

A high standard in our lecture courses, with fewer lectures, if

deemed wise, which will guide us to advanced horticulture, are better than more lectures too hastily constructed.

If subjects which will be of most benefit to our horticulturists are selected early and submitted for the careful study of those who are at work for us in our Experiment Stations, combining science with practice, I am sure their professors will be glad to use our platform to make known their conclusions, and to meet our horticulturists in a mutual exchange of opinions afterwards.

I am sure that your officers and committees are all most sincerely interested to promote our work in a way that will be most effective; but I know that they are hampered by the conditions that now surround them.

If I have appeared to have spoken at too great length, and to have spoken too frankly to the minds of any, I assure you that it is only with a view towards the best interests of what we are all here to work for.

The address was received with applause, and on motion of Ex-President William H. Spooner it was voted that the President be requested to furnish a copy for publication.

The following appropriations, recommended by the Executive Committee on Saturday, the 2d of November, 1895, came up for final action and were unanimously voted, viz.:

For Prizes and Gratuities:

For Plants	$2,000
For Flowers	2,600
For Fruits	1,800
For Vegetables	1,150
For Gardens	500
Total for Prizes and Gratuities for the year 1896	$8,050
For the Committee on Lectures and Publication, this sum to include the income of $50 from the John Lewis Russell Fund	300

The Executive Committee further recommended the following appropriations, which were also unanimously voted, viz.:

For the salaries of the Secretary and Librarian, and the Treasurer and Superintendent of the Building	$3,000
For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee	400

For the Library Committee, for the purchase of magazines and newspapers, binding of books, and incidental expenses of the Committee $400

For the same Committee, to continue the Card Catalogue of Plates 100

For the Committee on School Gardens and Children's Herbariums, this sum to cover all incidental expenses of the Committee, and to be paid through the usual channels 250

The Executive Committee also reported the appointment of Charles E. Richardson to be Treasurer and Superintendent of the Building, and Robert Manning to be Secretary and Librarian for the year 1896.

J. D. W. French, Chairman of the Commitee on Lectures and Discussions, announced the Programme for the present year, the course to begin on the next Saturday, when E. O. Orpet, of South Lancaster, would read a paper on Hardy Garden Plants, which all were freely and cordially invited to attend.

Robert Manning read his Annual Report as Secretary and Librarian.

Charles N. Brackett, Chairman of the Committee on Vegetables, read the Annual Report of that Committee.

Henry L. Clapp, of the Committee on School Gardens and Children's Herbariums, read the Annual Report of that Committee. A supplementary report was postponed to the next meeting.

These three reports were severally accepted, and referred to the Committee on Publication.

A vote of thanks to Waldo O. Ross for his gift to the Library of forty-seven volumes of " Nature " was unanimously passed.

Benjamin M. Watson moved the appointment of a committee to confer with the retiring President in regard to adding his portrait to the series of portraits of the Presidents of the Society. The motion was carried, and the Chair appointed as that Committee, Mr. Watson, Desmond Fitzgerald, and C. Minot Weld.

J. D. W. French made the following motion: That the Committee on Finance, in consultation with the Committee on the

Library, be authorized to make arrangements for the storage of a portion of the books in some fire-proof building, to relieve the present crowded condition of the shelves. This motion was carried.

On motion of M. H. Norton the thanks of the Society were unanimously presented to the retiring President for the able and impartial manner in which he had performed the duties of his office for the last three years.

A letter was read from Hollis Webster, Secretary of the Boston Mycological Club, expressing the thanks of the Club for the courtesy shown them by the Society, and hearty thanks for the generous hospitality extended.

C. H. TENNEY, of Methuen, and
WILLIAM DONALD, of West Roxbury,

having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected.

Adjourned to Saturday, February 1.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 11, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

HARDY GARDEN PLANTS.

By E. O. ORPET, of South Lancaster.

There is perhaps no need for one to apologize for appearing before a Massachusetts audience on the subject of this paper, for there is probably no other section of the United States where this class of plants is so largely used and appreciated for decorative gardening. Our latitude is well adapted to their culture, owing to the heavy falls, during our average winter, of snow, which is the best of all protecting mediums, and to our summers not being so hot or so dry as in some other parts of the country. We have a climate adapted to grow plants that come from almost all parts of the world, and the possibilities of the hardy flower garden are as great as those of any other branch of Horticulture.

well studied and the wants of the plants supplied with intelgence.

To begin at the root of the matter, as it were, one thing has ten struck me as being absolutely necessary to success, and at is a good preparation for the purpose intended. If one tends to plant a tree it is generally conceded that the operation ould be the event of that tree's history in that garden. Whether it be for beauty or utility, there should be careful reparation of the soil, and even more careful choice of situation, nce there is to be no more change once the tree is in place. he making of a border for hardy herbaceous and bulbous plants likewise a permanent matter, for most of these never succeed well as when left alone and allowed to get deep foothold in e place assigned to them. Changes of a minor nature there ust be in the natural order of things, but these can be made ithout an undue upheaval, for it will take a year or two for a mplete recovery to vigor and profuse bloom.

To secure the best results a soil of good depth, with a good pply of natural moisture, and free from the influence of large ee roots is the ideal position for the cultivation of these plants, d, given these conditions, there are unlimited possibilities, and place where flowers can be gathered from April to November. he soil ought to be dug for at least two feet in depth and made ch at starting, for it is well to keep in mind at all times that a rder of this kind should never be dug with spade or fork after ing once planted, for, given all the knowledge that pertains to e subject and all possible skill with the implement, it is not ssible to dig in among plants of this nature without injuring ore or less of them, and this again emphasizes the need of a od preparation beforehand. If it is desired, after the lapse of ars, to fertilize to keep up the necessary vitality, it can always done in the way of top-dressings in autumn, after the advent cold sufficient to make all dormant for the winter. These topessings should consist of well-decayed material that will be sily assimilated by the plants in the spring, and the luxuriance the returning foliage will cover the whole so that there will no objectionable appearance in the beds.

It is not my intention to give a list of plants that are suited this kind of gardening; these can be had from any good catague, and their habit and time of bloom also; but it has seemed

to me well to note some that are not specially desirable in a general way. We hear too little of failures; people do not always care to chronicle them, but it is a pity, for much can be learned from them. Some plants seem to have the ability to appropriate a good deal more than consists with the well-being of others surrounding them. Such is the case with *Achillea serrata*, sometimes also called The Pearl, for, given a small plant to start with in the spring, it will by fall have taken to itself a square yard of soil area, and is, besides, a most difficult thing to dig out of other plants. The smooth-leaved Sunflower, *Helianthus lævis*, I have been trying to eradicate for five years in our own borders, but we seem to be as far away from the desired end as ever. It is a decidedly decorative subject in its season, but as it flowers when so many similar plants are in bloom, it is almost impossible to avoid some that are in bloom, and a crop of seed is matured that will make its perpetuity sure. The pretty *Anemone Pennsylvanica* I have also begun to think is impossible to get rid of, for the more one digs the more it spreads. The variegated form of *Ægopodium Podagraria*, the Bishop weed, is sometimes offered in lists, but a more troublesome weed does not exist; it has cost thousands of dollars to dig it out in Central Park, New York, and when visiting the famous gardens at Belvoir Castle last summer, the gardener told me that ever since he took charge he had kept two men doing little else than digging out this weed. And so this list might be added to, and made much longer; but the moral is, a place for everything, and everything in its place. If such subjects were rigidly kept in the wild garden we should hear less complaint as to the ragged appearance of this class of plants, and there would be much less misery for the cultivator. Even among what are undoubtedly regarded as desirable subjects for all borders, there are many that are too apt to increase at the expense of those with less vigor, and these must be checked at all times if the desired harmony is to be maintained.

In our case we like to plant thickly at the outset, using plenty of the sorts easily raised from seed, to cover the space quickly, and thin these out as the better plants take hold, and gradually work out the desired effect. We have also found that in various situations, plants behave differently, each locality suiting some one or other better than we knew, and these have to be lifted and replaced in a more fitting position to preserve the balance of

e whole. This, as indeed all planting of hardy plants, is best ne early in the fall, about the time the heavy rains begin; the rth has not then lost its warmth, moisture is present to enable e young roots to take hold quickly, and in most cases there ll be no reason the next year to suppose any change has been ade as far as the health of the plant is concerned. Spring anting is unwise in many ways, always supposing one has the her alternative; we all have enough to do in spring, dealers cluded, and I have invariably found that we could procure tter stock in fall than in spring, and could rely on getting it a condition fit to plant, whereas in the spring, in sending to a stance, perhaps we get plants that have been in the best con- tion to plant a month before our ground was free from frost. is at all times desirable to get all the work done that we can the fall, to avoid the spring pressure at home.

Lilies should most surely be planted in the autumn, and also arcissuses and other bulbs. It does seem sometimes that Lilies e not appreciated as they deserve in our outdoor effects. At ew last summer I was impressed with the freedom with which ey were planted, not alone in their natural order, but among ds of low-growing shrubs and evergreens, especially Rhodo- ndrons. The effect was very beautiful at the time of my sit, and would be for the greater part of the summer, as e various species came into bloom. We can grow these autiful plants here with as great or greater success pan Lilies are well adapted to our climate here in the East- n States, and with few exceptions are permanent garden plants. is is easily explained by the fact that our territory east of the lleghanies is identical in extent and latitude with that of Japan e climate also being very similar, having the same extremes of at and cold, so that plants from the East thrive here much bet- r than in Europe. To illustrate, I was much surprised to see Kew last summer large numbers of *Hydrangea paniculata* own in pots in the greenhouses, and, on asking the reason, was ld that they could not flower them unless the growth was pened up indoors. We ought to see more Lilies planted here in rdens; they are impatient of a dry soil in summer, or of one in hich moisture is superabundant in winter, but in ordinary gar- n soil they thrive with great success. The best of all positions among the Rhododendrons, and here we can have a succession

that come on one after another until September frosts. The shade afforded by the Rhododendrons gives a cool soil at all times, and a slight protection from late spring frosts to the young shoots, and in fall the leaves placed about the roots of the Rhododendrons give a sure and safe guard against severe cold, and also keep the bulbs from starting prematurely. There was a time when it was regarded as an astonishing feat to flower *Lilium giganteum* in the outdoor garden, but in such a position as that named, there is no difficulty in not only flowering it for one season, but in growing and increasing the plants indefinitely, and when well grown and flowered, there is no other Lily, and very few hardy plants, that can approach it in its majestic vigor. I have seen the flower stems over ten feet high in the garden of Hon. John Simpkins, at Yarmouthport; his were strong, well-established clumps, and perhaps the finest ever seen in cultivation. There is no reason why this Lily cannot be grown in any garden, but care must be taken in procuring bulbs that are true to name. We have been sadly mistaken once in being supplied with bulbs of *L. cordifolium* for the true *L. giganteum*. There is also another Himalayan lily of tested hardiness here in Massachusetts; I refer to *L. sulphureum*, or *Wallichianum superbum* as it is more often called, though not so correctly. This is one of the most lovely lilies there are, and the specific name "sulphureum" aptly describes the soft yellow interior of the large flowers. Although it comes from the Himalayas, it is as hardy as *L. tigrinum*, and, like the old Tiger Lily, produces little bulbs from the base of each leaf. We have about three dozen nice young bulbs, almost as large as a hen's egg, these being only a year old, and most of them will flower next summer if permitted. This lily used to be rare and costly, but it has recently been propagated in this country to a large extent, and will soon be as cheap as other varieties.

It seems to me that we have too often been inclined to consider these and other plants tender, and coddle them in the greenhouse for no other reason than that they come from the East Indies, forgetting all the time that it is not merely latitude or longitude that concerns us as cultivators, but altitude. If we give but a moment's thought it is reasonable enough; we get Orchids from directly under the Equator that require the coolest possible treatment in greenhouses, and no doubt there are plenty

f plants there also that are hardy enough here outdoors, and a eading of the account of Whymper's ascent of Chimborazo akes one wonder all the more that they have not been seen in ultivation.

While on the subject of lilies, there is one from Central China hat will be a decided gain to our gardens when it is more plenti-il. I refer to *L. Henryi*, which, as seen at Kew last season, is ost distinct, vigorous, and free-flowering. I saw plants that were ight feet high, and bore over thirty of the uniform apricot yellow looms to a stem; this may not be the maximum number, but it as been attained gradually; each year more strength has brought ore bloom and no signs of deterioration have been apparent, and here is every reason to believe that it is as good as it is beauti-il. *L. auratum platyphyllum* is another good garden lily that is ot common; it seems to be a well-marked form of *L. auratum*, ith very broad foliage — as broad as that of *L. speciosum*, and ke that species, it will thrive indefinitely in the border, the loom being almost identical with that of *L. auratum*. The apanese seem now to appreciate that these rare forms are worth ultivating for export, and we can now obtain them at a very easonable rate. *L. auratum platyphyllum*, or, as it is often alled, *L. auratum macranthum*, is one of the finest lilies for the arden, and indeed has been called the "King of all Lilies."

No garden seems to be complete in the early spring months ithout a selection of Narcissuses, and, taking the best of these, here are few more reliable bulbs for garden use. Of recent ears there has been a revival in Narcissus culture that has mounted to a craze, and it has resulted in the production of arden hybrids and forms innumerable. Collectors have also een sent through Southern Europe in search of those that are ess known. These two facts need emphasis, for they are fraught ith considerable meaning to American cultivators of the Nar-issus. We have during recent years made an extensive trial of ost of these new introductions, especially those of Spanish rigin, and we find that after flowering the first year they dwin-le away and rarely succeed in gardens; indeed, of the many hat we have had, such as Johnsonii, Queen of Spain, Saragossa, anta Maria, King Humbert, Pelayo, and others, it is safe to say hat not one bulb remains; but though we have not the bulbs, we ave the knowledge, and this was the primary reason why they

were planted — to find out which were reliable and most desirable. On the contrary, taking those of hybrid or garden origin, there are few indeed that will fail in American gardens, and by a fortunate coincidence these are by far the best Daffodils. There are raisers today who cultivate and hybridize Narcissuses as carefully as the raisers of hybrid Orchids, the pedigree is as carefully recorded, and all pains taken to improve the race. The reason is simple enough, for there is very little credit or profit in giving to the world such as are not of easy propagation and of vigorous constitution. If they lack these two requisites, we never see them disseminated, and we conclude that all Narcissuses of garden origin are vigorous. There is a phase of Narcissus culture that is too rarely seen in American gardens, and that is naturalized among grass in semi-wild or shady places. The Poet's Narcissus, and the numerous forms that have allegiance to it, all the *incomparabilis* section, and in fact all that have flowers of starry outline, look best and thrive well when planted among grass that is not too rank-growing; and even if this has to be cut off about midsummer, at haying time, the foliage will be ripening off then, and no injury will result from cutting off the tops at that time. There is also less liability to decay from the dreaded base rot than when cultivated in rich soil in borders, though I am inclined to believe that we shall never have so much trouble from this source as is experienced in European gardens. We have never had an authentic case of it in our garden; what was feared at one time to be a case, was simply the deterioration before-mentioned of kinds that were unfitted to the climate.

For cutting for indoor decoration there are few to excel such as Empress, Horsfieldii, Michael Foster, and William Wilks, all of which are bicolors and bloom in succession. Countess of Annesley, Emperor, Sir Watkin, Princeps, and Golden Spur are all of the larger-flowered yellow varieties, and to these may be added the *incomparabilis* and *Barrii* sections that are so plentiful in varieties, but prove to be well adapted to our climate. We have always preferred to keep these bulbs out of the mixed or herbaceous border proper, and keep them in a separate border, which in summer is planted with annuals for cutting purposes; these shade the soil from the burning sun in summer and give also a double crop, as it were, from the same piece of ground. The

Narcissuses are planted in rows sixteen inches apart, and the annuals, such as Stocks, Asters, Mignonette, and like subjects, are set out between each row, and these are gay in late summer and autumn. When these annuals are cleared off after frost, a top-dressing is given all over the beds, and this is all the fertilizer they seem to require. The Narcissus will not thrive indefinitely in the same spot with the same vigor as when lifted every three years and sorted in sizes, replanting them after the soil has been enriched to a good depth. The best time to lift is at the dying off of the foliage; the roots are then found to have died off too, except in the *Poeticus* section, which seem never to be wholly inactive. It is, of course, quite in keeping with a herbaceous border to have clumps of Narcissus mixed in here and there along the margin, and where but few are grown, this is, perhaps, the most desirable way, but where there is a collection of many varieties, it is preferable to have them where labels will not be disturbed and where each kind is near the other for comparison.

I am anxious to say a word or two in favor of the various Tulips other than those generally used for massing for color effects. There are a number of genuine species of Tulips that are most beautiful in the mixed border, and they have also greater vigor and taller habit, and grow on for any number of years without deterioration. *Tulipa Gesneriana* may be taken as the type of these late-flowering kinds, and there are few bulbs that give such rich coloring as this; it is rich without being gaudy. Then there is the Horned Tulip, *T. cornuta*, with petals that narrow out to a point; *T. Greigi*, with its rich colors and prettily spotted leaves; *T. vitellina*, a pure yellow; and so we may go on to the number of fifty or more species that are not often seen cultivated, but some of which are real gems for the rock garden, being of dwarf habit and liable to be spattered by rain if planted on the level ground. You have no doubt heard of the so-called Darwin Tulips. This is only a new name for the old-time Breeder Tulips of the Flemish and English raisers; they were so called because from these were selected the kinds that were considered good enough for naming. The Tulip craze has mostly died out, but the lovely colors of this section give them a charm that is peculiar, and rarely tires; rich dark velvety colors predominate, yellows being absent; no two are alike if bought in mixture;

their stems are erect, stiff, and admirably adapted for cutting. With us they flower at the end of May, and we have found that they like a soil which is not liable to dry out, as the quality of the bloom suffers in dry soil. It is advisable to plant these tulips in small groups of six or eight, and it will be found that each year the quantity of bloom is about doubled from each clump and they are altogether most satisfactory.

Another beautiful hardy plant which is not common, but is perfectly reliable, is *Eremurus robustus*. I know of no other that will give the same effect except the Verbascums, and these are not really hardy. The *E. robustus* throws up a spike from five to six feet high, and for the greater part of its length covered with pale pink flowers which open in quick succession, so that the greater portion is in bloom at the same time. The foliage is prostrate or nearly so when full grown, and soon dies off after blooming, which it does at midsummer. It is one of the noblest of garden plants, so far as our experience goes — not easy to raise from seeds, for very little seed is matured, but once planted, there is no fear of losing it. There is another species, *E. Himalaicus*, which has grown well each year, and we hope to see it bloom this coming season. Mr. Veitch tells me that it is beautiful as seen growing in its home, and is the most beautiful of the genus. There are several other species, but we have no positive knowledge yet as to their hardiness. The place where they are planted should be well marked, or better still, group them together, as the foliage dies off soon after flowering, and some other plants of annual duration may be used to cover the ground.

It is not my province to speak of Annuals as a class at this time, but it is tolerably certain that we cannot do without them in the mixed herbaceous, or whatever other name is given to the border. There is sure to be a scarcity of bloom in July and August, if perennials are relied upon to give a continued effect, for there are so many and varied subjects used in this work, which start early and die off soon after bloom is past, as, for instance, the Oriental Poppies, Mertensia, all bulbs, and more that might be named. The gaps which they leave in the arrangement are not pleasing. It is an easy matter to dot in Zinnias, Asters, Stocks, or even taller-growing annuals, to make good the deficiency, and to give a greater profusion of bloom.

Another point worth naming in this connection is the desirability of having a permanent backing to the borders, if they are extensive, or especially if wide. Ours are twelve feet wide for most of their length, and give scope for the tallest plants there are; but to each border there is a single belt of either *Rosa Rugosa*, *Pyrus Japonica*, *Hydrangea paniculata*, or *Syringa* (Lilacs), each used separately, and this gives a stability to the effect that would not exist otherwise. In the early summer months before the tall Larkspurs, Sunflowers, Asters, and Boltonias get up high enough to serve as a background, we have these early flowering shrubs in bloom, and the effect is greatly enhanced. Another feature — perhaps the most striking of all — is when in late summer the long belt of hardy Hydrangeas is at its best. This is kept well pruned down, and the shoots are thinned out when they start, to give size to the panicles of bloom.

I suppose most of you have the *Dictamnus Fraxinella;* it is well known for its inflammable qualities, but it is not so well known for its poisonous properties. A neighbor last summer had severe eruptions on his arms, and the family physician, a man of long experience, could not diagnose the case, but before admitting this, he very nearly decided it was a case of small-pox, and it also transpired that this poisonous property was not accredited to the plant in his reference books. Being so common in gardens, and so frequently handled when in bloom, its most virulent period, it cannot be too well known that it is a dangerous thing to handle, as I found out years ago when saving and cleaning seeds.

To those who have the requisite location, there are few more interesting features of outdoor gardening than that styled the Rock Garden. I saw two of the best examples of artificial construction last summer that perhaps are to be seen, and it seemed to me that we might do more of it here. We are limited to a comparatively few plants in our climate; the exquisite Saxifrages of the European Alps, the Primulas, Androsaces, Ramondias, Cyclamens, and many of the plants they use abroad will not succeed here, and for that matter some of our choicest Rocky Mountain Alpines absolutely refuse to grow when brought from their high estate, but there are many that will succeed if given a little attention. A well-constructed garden of this sort has a most charming effect when the Moss Pinks, Columbines, and various spring-flowering bulbs are in bloom. It is at all times

advisable to see that the strong do not crowd out the weak, and in this kind of planting it is not possible to use the hoe, and seedlings are sure to appear in abundance, often to the exclusion of the choicest plants. This is true also of borders, and we find that in a short time the best Larkspurs and Phloxes seem to revert to original types, and Columbines hybridize out of recognition; but it is all explained by the fact that seedlings are too numerous, and, until they bloom, have much the same appearance. I am inclined to think the Aquilegias are not strictly perennial; they flower for a year or two, and then disappear. I think this is true also to some extent with all plants that have not a tuberous or bulbous root. We all know how difficult it is to keep the true Rocky Mountain Columbine, or the Siberian *Aquilegia glandulosa;* this all means that we must have a reserve border, where a few plants can be isolated for seed, and the seedlings grown on to fill up losses, or we can test some doubtful plant and propagate desirable ones. There are many reasons which make a place of this description desirable that will occur to all.

Most hardy plants are easily raised from seed, and a seedling plant that is healthy, even though it has never bloomed, is preferable in the long run to any other; there is no serious check in transplanting, neither has it been weakened by flowering. The best time to sow seed would be as soon as gathered; but we usually have too much hot weather at that time, and it is best to wait until a cooler time in fall. If there is a greenhouse at disposal, they can be sown at any time during winter; but I much prefer to get them large enough to be able to winter them over in cold frames, where they do not start much earlier than they would outdoors, and they can be placed in their permanent positions as soon as the ground permits. On the other hand, such as have been grown in the greenhouse need as careful hardening off as if not hardy, for they are made as tender as any plants by their treatment indoors. If any of the seeds fail to germinate, though they are known to be fresh, it is well to put them in a cold place where the soil can be frozen well for a week or two. This seems essential to success with some, such as *Aquilegia Stuarti*, *A. glandulosa*, Anthericums, Hellebores, Clematises, *Rosa rugosa*, and many others that would germinate a few at a time for years, but will come up simultaneously if the freezing

process is adopted, and herein is one of the main advantages of sowing early in the fall.

Discussion.

Mr. Orpet said that *Aster Novæ Angliæ* becomes a weed in the garden.

Professor B. M. Watson asked what success had been obtained with *Lilium auratum.* Mr. Orpet answered that it was impossible to make it grow more than two years, but as it is so cheap we cannot complain of the necessity of renewing it.

Nathaniel T. Kidder inquired about *Tulipa Greigi.* Mr. Orpet said he had grown it for five years, and considered it one of the best of spring plants.

In answer to several questions by F. L. Temple, Mr. Orpet replied that double Delphiniums, such as named French varieties, often die the first winter after importation, but seeds saved from these varieties and sown produce a large percentage of double forms, and these are good permanent garden plants. Aquilegias, too, often act in like manner, dying after the first flowering, and are best taken care of when seeds are saved from the best forms and species and sown each year. *Helenium autumnale* is desirable as a plant for the back border. He never knew the Oriental poppy to winter kill. Gaillardias, however, are hardy perennials which disappear after a short time. The double *Lychnis chalcedonica* is a grand plant to grow in masses. It has been thought to be new to cultivation, but was advertised in catalogues in 1832. He never knew it to grow four feet high; generally it is only two. As the double *L. chalcedonica* does not produce seeds, it must be propagated by means of the suckers made at the base of the old flower stems; these may easily be rooted, but should be wintered over in a cold frame until spring before planting out in the open ground. *Lychnis vespertina fl. pl.* is more beautiful and easier to propagate.

Mr. Temple stated that he had had a form of *Lychnis vespertina fl. pl.* that had flowers as large as a Carnation, and it was sent out as a new and beautiful form.

J. Woodward Manning said that the Double White and Double Scarlet *Lychnis chalcedonica* grow from three to three and one-half feet in America. He also spoke of the Gaillardias, which are true perennials in England, but have the unfortunate habit

of dying out in the centre of the crowns yearly, and for that reason are hardly to be depended upon in our climate.

Mr. Orpet said that Mr. Manning was perfectly correct in regards to Gaillardias, but thought they should be grown if they flower only one year. *Alstrœmeria aurea* is perfectly hardy, and becomes quite a weed in Rhododendron beds. *Lychnis Haageana* is a perennial which lasts for several years, and then dies out.

Mr. Temple wished to call attention to the practice of cutting back perennial border plants with a view to making a display late in the season, and Mr. Orpet stated that in one of the places he had had charge of, the family did not reside there until late in the season, and to produce a late display it was a regular practice to cut back Phloxes, Delphiniums, Heleniums, Silphiums, Asters, and all plants of like growth, so as to produce a late effect from plants that ordinarily would be past their prime.

M. H. Norton stated that by cutting back roses, and keeping the ground moist, they can be kept in bloom during the whole summer.

Mr. Kidder noted that herbaceous plants are comparatively free from insects. He spoke of a new and very destructive insect found on *Anemone Japonica*, and asked if others present knew it.

Mr. Orpet had seen the same insect on Baptisia, and expected to find it on everything next year. Rose-bugs go the whole round of the garden. As to alum dissolved in water, which had been recommended as a remedy for rose-bugs, an ounce to two gallons of water had proved ineffectual.

J. H. Bowditch asked about Aquilegias, which were raised from seed, and succeeded for a few years; then there seemed to be a borer which destroyed them. Mr. Orpet said that plants grow to an exceptionally vigorous state in gardens and are then more liable to rot. He never had much difficulty in transplanting Aquilegias, except *A. glandulosa;* it is very difficult to make this species live after removal. The best way is to raise from seed, and set out from pots; then they will live four or five years.

Professor Watson had found that hand picking is the only absolute remedy for the black beetle which eats *Anemone Japonica* and Clematises. This must be done early in the morning. Bordeaux mixture made very weak has proved successful.

Mr. Manning said that cut-worms and angle-worms enter into

the crowns of Aquilegias and Delphiniums, and do much damage, as also is the case with the wire-worm, to a certain extent.

Mr. Orpet agreed with Mr. Manning, and added that all our native species of Aquilegia are very beautiful, and should be raised from seed saved from plants growing in isolated places, owing to the facility with which the species hybridize. In speaking of so-called perennial plants, he said that they are not all strictly perennial naturally.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 18, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture, provided by the Massachusetts Society for Promoting Agriculture, was delivered:

CONSERVATISM IN SCIENTIFIC AGRICULTURE.

By Professor W. H. JORDAN, Director of the Maine State College Agricultural Experiment Station, Orono, Maine.

The American Agricultural Experiment Station is this year twenty years old; the American College of Agriculture is older. During at least a quarter of a century the teacher and investigator, to a greater or less extent, have been active in this land of ours in their efforts to illuminate the business of the farmer with the beneficent light of Science.

Their success has not been startling, though great enough to justify the effort. Inexperience, imperfect knowledge, the immense labor of successful teaching and investigation, prejudice, the inertia that always attends any educational movement, all have conspired to render the attainment of the ultimate object, viz., a more rational practice of agriculture, slow and difficult.

From one point of view, however, a great deal has been accomplished. Generous endowments, both State and National, expended by a large body of trained workers, an enlightened thought, and an improved farm practice testify not only to past achievements but to present effort on a scale that is truly marvelous.

We may possibly gain courage for our work and faith that the future has its triumphs, and we shall certainly properly introduce our subject, if we gather up into a brief summary a statement of the resources that are now being applied along various lines, to the betterment of agriculture.

According to official statistics there were in 1894 sixty institutions in the United States maintaining courses in agriculture. The faculties of these institutions included one thousand six hundred and forty-three persons, who were using annually nearly four and a half millions of dollars in the instruction of over twenty-one thousand students, about one-fifth of whom are registered in the Course in Agriculture. In the same year the Experiment Stations numbered fifty-five, fifty-one of them receiving Government aid. These stations were officered by five hundred and seventy-seven persons, who were using annually in various ways nearly a million dollars. They published in the year mentioned fifty-four annual reports and four hundred and one bulletins, and distributed this literature to half a million persons who are either directly or indirectly interested in agricultural affairs.

It appears, then, that the time of perhaps two thousand persons,[1] and the outlay of five and one-half million of dollars, are annually being applied to education and investigation, largely that the farmer may know more and do better. It is worthy of remark in passing that of this large sum of money, over two and a quarter million dollars are a direct gift from the national Government. Not all of the expenditure for the maintenance of student instruction in the land-grant colleges is used in teaching agriculture, but a generous proportion is — much larger than is indicated by the percentage of agricultural students.

In addition to this national aid to agriculture, which surpasses that ever provided by any other nation, a majority of the States have established boards of agriculture and have arranged by law for the public instruction of farmers, either through what are called farmers' institutes or by means of migratory schools, such as the dairy schools of New York. We have no means of estimating the time and money thus utilized quite directly for the popular education of the agriculturist, but their amount is large.

This, then, is the situation: Agriculture along with other industries is recognized in our higher institutions of learning

[1] Some who are engaged in teaching are also station workers.

both by elaborate courses of study and by liberally endowed departments of investigation; a great mass of literature dealing with the scientific and semi-scientific phases of agriculture is being spread broadcast over the land; a small army of public teachers, both official and self-constituted, are addressing audiences of farmers from the platform, on every subject that has even a remote relation to farming, and the agricultural press, not to be outstripped in this onward march of new theories and modern methods, is active in reviewing Experiment Station literature and in presenting the views of a great variety of writers, including the scientist, the pseudo-scientist, and the so-called practical man. And so from all this probing for nature's secrets, this speaking and writing, this discussion of new theories and methods, some of which live but for a day, some of which become the vexed subjects of prolonged, earnest discussion, and some of which crystallize into practice, we have attained to an activity of thought, an elaborateness of treatment, and a complexity of detail concerning things agricultural, which present a marked contrast with the conditions that prevailed even twenty-five years ago.

There is at least one complaint the farmers of the United States no longer have the right to utter, which is, that they do not receive full recognition in the exercise of the paternal functions of the National and State governments, or in the growth of the means and methods of public education. Whatever may have been their motives, or the arguments which may have been so successfully used in influencing their action, the representatives of the people have, in their exercise of legislative authority, dealt fairly generously with the industry that feeds us all. Our government may reasonably claim to have done its part up to the present time in the efforts that are being made to impart special education and to discover needed truth.

The question which must come to the workers in College and Station with great force and meaning is: Are we justifying this great use of time and money by what we are accomplishing? Is this tremendous activity that we are putting forth being directed along the right channels? Are those who are teaching and investigating and who are speaking through the press or from the platform, fully recognizing the real needs of agriculture?

It has seemed to me that on this occasion, in the year which marks the twentieth anniversary of the establishment of the first American Experiment Station, it is entirely fitting to ask these questions, and to discuss our relation to their future satisfactory answer.

It is not my purpose at this time to attempt a statistical enumeration and discussion of our appliances for education and investigation, or to undertake a detailed criticism of the methods in vogue in the College and Experiment Station. I do propose, however, to call attention to certain general considerations which I believe should have a controlling influence in the development of class-room and popular instruction, and in the various lines of experiment and investigation.

The subject that is set for discussion is, Conservatism in Scientific Agriculture, which perhaps needs a preliminary definition as indicating the lines of thought which it is proposed to follow.

The conservatism for which I would contend is that which is induced by a recognition of three truths:

First. The proper cultivation of the man is fundamental to the safe development and right use of material resources.

Second. The education, that in agriculture is primarily important, proceeds from instruction in the relations of matter and energy and in the scientific facts and principles which enter into and environ life, rather than in imparting the technics and manual skill of the farm.

Third. Substantial progress in any art must be based upon an accurate knowledge of underlying truths.

Scientific Agriculture is commonly understood to be the practice of agriculture in accordance with the known facts and principles of science, but in our discussion today we will understand it to include as well the various organizations and activities that are auxiliary to agriculture as the means of rendering it more rational. Our subject involves, therefore:

(1.) The Experiment Station.
(2.) College and School Instruction.
(3.) The Farmers' Institute.
(4.) The Press.
(5.) The Farmer.

These I understand to be the various agencies through which an organized effort is being made to convey to agricultural practices the benefits of the exact knowledge we call Science.

We will first consider, then, scientific investigation as a factor of modern agriculture. This is certainly the logical order, for we must discover truth before we can teach it. What relation does our subject bear to the work of the Experiment Station?

There exist, I believe, substantial reasons for the following assertions:

(1.) Much of the experimental data and conclusions now being published by American Experiment Stations will not only fail to find a permanent and useful place in the records of scientific progress, but they have been so reached as to make error easily possible.

(2.) The greatest obstacle to progress, or even safe procedure, in the art of agriculture, now existing, is an insufficient knowledge of foundation facts and principles.

(3.) The two foregoing statements suggest the easy possibility of disappointment from any practice induced by Experiment Station influence when that practice rests as a superstructure upon unsafe or insufficient foundations.

I desire to enlarge at some length upon these statements in order that my meaning may be plain.

And I remark concerning the facts touched by the first statement that they are due in part to a cause which serves as a partial excuse for their existence.

There has existed a natural but unreasonable demand on the part of the public for immediate practical results from Experiment Station work, and so from reasons of policy some have felt it to be necessary to rapidly promulgate conclusions with regard to this or that point in agricultural practice.

In order to do this, experiments of a very practical character have been carried on — experiments, some of them, involving such large chances of error that safe conclusions were not possible. Many of the field tests of fertilizers, feeding experiments, and variety tests are of this class, and the records of them have already begun to find their way into that mass of rubbish which will remain forever buried.

A satisfactory control of such experiments, so that their

apparent outcome may represent the truth, is exceedingly difficult, and even under the best of conditions much repetition and care are necessary to prevent reaching erroneous conclusions.

The discovery and establishment of a truth is no commonplace task. It is not easy so to hedge about a new principle or fact with accurate data that it may be accepted with unreserved confidence, and it has often required years of enthusiastic devotion to scientific labor to accomplish this. These facts the unscientific mind does not apprehend, and so the public is inclined to expect Experiment Stations to reach safe results with the uniform certainty and regularity of a machine.

We are fully convinced that we should have less commercial work, less of the extremely practical experiments, and more of elaborate and severe scientific investigation, — at least there is need that there shall be less haste in the promulgation of conclusions because of a more rigid inquiry into the basis upon which they rest.

There is certainly one reason that every farmer ought to appreciate, why any conclusion which affects his business should be guaranteed by the most exacting inquiry, viz.: the business of agriculture cannot afford the delay or disaster which may result from wrong conclusions. Could we have afforded to adopt the Babcock Test as the basis of commercial dairy work had not the facts fundamental to its use been well established? Should it be proved that the diagnostic properties of tuberculin are not what a conservative opinion has claimed, — a result we do not fear, — would it not be properly regarded as a great disaster for such a mistake to have been made? We plead, therefore, for the conservatism of exact scientific methods in our Experiment Stations and for a patient confidence on the part of the public in what may appear to be slow progress in the solution of Nature's problems.

My second point touching Experiment Station work relates to the imperative need for a better knowledge of those fundamental facts and principles which we think of as belonging to pure science.

We are to some extent attempting to build a superstructure upon insufficient foundations. For instance, we are conducting feeding experiments with foods, the nature and function of whose constituents we do not fully understand, and consequently

we often lack the data necessary to a proper interpretation of results. Until we have a wider and more exact knowledge concerning the character and nutritive functions of the various compounds which we huddle together under the terms *protein* and *nitrogen-free extract*, we shall be handicapped in our attempts to solve problems in animal nutrition.

Such investigations as Stone of Indiana is making on the non-nitrogenous compounds of foods, and workers in the two Connecticut Experiment Stations, on the nitrogenous compounds of the cereal grains and on the functions and value of nutrients, will, I am sure, ultimately prove of much greater service to Agriculture than that large class of experiments which have a more apparent practical application.

It is worthy of note that the only investigations which have outlived a half or even quarter of a century, and which have exerted a profound influence upon Agriculture as an art, are those of a severely scientific character, — investigations which were carried on in the laboratories of scientists who little dreamed of the far-reaching influence of their labors. The men who have given to the word Science the great meaning and dignity which it now has, have been lovers of the truth for truth's sake, and I sometimes fear that we as a people are not cultivating the spirit of the true investigator as we should. Is it true that our scientific labors are taking on a merely commercial aspect? Are we asking as the introduction to every piece of scientific work the question, How much will it be worth in dollars and cents?

For some, these questions fortunately can be answered in the negative. It is desirable, however, that the enthusiastic scientific spirit shall more thoroughly pervade our Experiment Stations, for we sorely need the inevitable outcome of such a spirit. While it is properly a function of the Station to show how existing knowledge may be utilized, by experiments which serve as object lessons, I believe a more important function at the present stage of knowledge is the discovery of laws and facts fundamental to agricultural methods, leaving the application to farm practice of much of this added knowledge largely with the mass of intelligent farmers, where, after all, it must generally be left. I affirm, then, that the conclusions derived from Experiment Station work should manifest a conservatism that is induced by severe and searching methods of experiment and investigation.

Our attention will now be directed towards the work of the schools. This is of prime importance, because here are to be trained the men who will be influential in determining the status of agriculture. The standing of any profession or business depends not so much upon the kind of work performed as upon the character and quality of the men engaged in it, provided, of course, that the work is honorable. If the social horizon of the tiller of the soil is narrow, it is not because he digs in Mother Earth, but is in part because of his inability to reach out to larger social and intellectual opportunities. While it is not to be expected that all the followers of any calling shall stand in the forefront of social and intellectual life, it is certainly true that if agriculture is to maintain its proper dignity and influence among the world's great industries, politically and socially, it must number among its followers men of the same intellectual ability and wide range of vision that are found in other callings.

Farmers have often complained that lawyers have chiefly legislated for them, but if this is true it is partly because they have not been shown their ability to determine their own political and social status. The conditions that make for supremacy in human society are not nullified or reversed as a favor to the farmer. At the same time that we recognize this fact we must admit another of equal importance, viz.: that the interests of agriculture, whether in legislation or in business and social conflicts, are safest in the hands of its own followers who are qualified by education and experience successfully to compete with opposing interests. For these reasons, then, we are anxious that the training of the schools shall render the best possible service to agriculture in the preparation of its leaders.

In order that this shall be accomplished, we must give place to a conservatism which recognizes the value of past experience in the means and methods of imparting a sound education.

When the land-grant colleges were first organized, a popular notion prevailed that an entirely new order of education was to be established — that the matter and manner of the classical college were to be replaced by other subjects and other methods. The young man was to be trained to do rather than to think. The introduction into the curricula of these schools of such subjects as the modern languages, literature, and metaphysics, or even extended instruction in the sciences, was resented by many as

foreign to the spirit and purpose of the act which made these new institutions possible. Had such views prevailed, the cause of technical education would have suffered great harm. These extremists forgot, or never knew, that a man's mastery of affairs does not proceed primarily from memorizing a catalogue of material facts or from manual skill, but rather from his capacity for severe and logical thought, and that a farmer's success is due not so much to his ability to plough a straight furrow or his capacity for hard labor, as to that analytical power of mind which enables him to discern the right relation of things. To equip a man merely with the technics of the practice of agriculture would fall far short of preparing him for that larger social influence which is essential to leadership or the highest success.

Fortunately, we believe, the four years' courses in agriculture, as now presented by our best institutions, include a fair proportion of general training subjects, combined with such a sequence of chemical, physical, and biological studies, that the faithful student not only attains a cultivated intellect, but is given a systematic insight into the world of matter and of life with which he has to deal. Such courses represent the conservative position, and are a logical result of the experience of the past.

That they do not impart sound learning and can only meet the demands of an inferior scholarship I do not for an instant admit.

It seems, however, that some who are interested in our land-grant colleges place a low estimate upon the educational value of Courses in Agriculture as they now exist. Certain recent utterances concerning this matter are like a dash of cold water in the face, to those who had come to regard the agricultural course in some of our colleges as the peer of any other found there.

The most notable of these utterances is the address delivered last winter before the Massachusetts Board of Agriculture by the able President of the New Hampshire Agricultural College. I propose, in this connection, to criticise some of the main points of this address, because they are based upon what in my judgment is a serious misconception of the essentials of a four years' Course in Agriculture, and because in so doing I may be able to make clear the views I desire to present.

Certain conclusions reached by President Murkland may be justly summarized as follows:

(1.) A "pedagogical form" is a "necessity for teaching any subject," meaning by pedagogical form a logical or progressive series of lessons.

(2.) The Courses in Mathematics and Classics have taken on a fixed pedagogical form, which (inferentially) gives them a maximum value as a means of education.

(3.) Courses of study related to agriculture and to engineering, especially the former, have suffered from lack of pedagogical form.

(4.) Engineering, because so closely allied to mathematics, has found a pedagogical form "ready to its hand in the established form of mathematical teaching," and so is now taught in fairly satisfactory courses of study.

(5.) Courses in Agriculture are in a present "practically inextricable" "confusion," because "with such material for teaching as is now available there is no perspective possible in teaching agriculture;" . . . "and where no other science is involved there is nothing of that orderly sequence in the progress of instruction which has made the classical education, and to some degree the scientific education, a process commanding respect."

These latter statements are mostly quotations from the address under discussion, and are those to which I shall chiefly confine my attention.

Dr. Murkland's strictures on the Courses of Agriculture that now exist are based in part on two assumptions:

(1.) That agriculture is, or is susceptible of becoming, an independent science, so that in classifying it for teaching purposes we may properly speak of "other sciences."

(2) That the sciences, such as the chemical and biological, which we now recognize as somewhat "precisely formulated," are not a proper and essential part of a Course in Agriculture, and therefore chemistry, physics, and biology do not, and may not, properly lend their pedagogical form to teaching engineering.

For myself, I cannot accept these assumptions. Agriculture is an art, and the Act of Congress of 1862 directed us to "teach the sciences related" thereto. To be sure we may speak of the theories of scientific agriculture as a science, but in order to

teach these theories as theories are taught in engineering courses we must give instruction not merely in "elementary chemistry" but in advanced chemistry, — the chemistry of the plant and animal, than which none is more profound; and what is true of chemistry is true of other sciences in their relation to the agricultural course. No student can be made properly to understand the facts of horticulture, of plant feeding, or of animal nutrition, until he is thoroughly grounded in the botanical, chemical, and physiological facts and principles underlying these subjects, and so, instead of teaching one science, we must teach several.

I do not see how it will ever be possible so to coördinate into a single science, for teaching purposes even, the mutual relations of physics, chemistry, biology, and physiology to the art of Agriculture, so that it will not be necessary to teach the individual sciences, unless the course in agriculture is made post-graduate. What then does the four years' course in agriculture become? Simply the teaching of a collection of sciences, along those lines which lead up to, and involve, a discussion of their application to the art of agriculture. When, therefore, chemistry, physics, botany, and physiology are taught in this relation, they do not lose their identity, but retain the same logical order which they have when taught as pure sciences, and they lend to the course in agriculture the teaching form which is considered so desirable.

As a matter of fact, four years' courses of agriculture, as now offered by some colleges, at least, are really specialized courses in the sciences, differing from the ordinary scientific course by pointing out the applications of the sciences to an art. Are such courses a mistake? Are they framed in accordance with false views? I believe not, and this is the reason for my belief: The real and important need of which the farmer is conscious, is for a knowledge of conditions, and not for methods or for skill in manipulation. When he clearly understands the reasons for that which goes on about him, the right method will appear. The difficulties lie with explanations, not with mechanical processes. And, besides, agriculture is not a business involving such delicate and intricate mechanical operations that attendance upon a college would be justified in order to learn them, although the modern dairy, the forcing house, and the fruit garden do require skill. But I venture to assert that no machines or practical methods have yet become available to the agriculturist, whose use the

clear-brained inmates of our farm homes have failed to master. The spraying of fruit with fungicides and insecticides illustrates how readily the necessary manipulation was acquired when the reasons for these operations became evident. It is the explanation of phenomena, then, which the extended course of study should give in order that the farmer may know how to adapt himself to the varying and complex conditions which he meets in his work.

The same educator, whose utterances I have called in question, has made other statements in his address which should not pass unnoticed. He declares that "arranging different courses of study, in a general agricultural course, is as nearly haphazard a process as anything can be in matters of instruction," and, that "certain text-books may be assigned to the senior year in one of these colleges, with absolutely no reason why they should not have been assigned to the freshman year, or, for that matter, to some year of the preparatory school course."

It would have been gratifying if President Murkland had illustrated this statement by specifying particular studies which are so devoid of relation to other subjects that their place in a course of study is in no way indicated, for then his meaning would be more clear. Did he have in mind the subject of tillage, which, unless considered in the light of the underlying principles of chemistry and physics, would be taught in a manner unworthy an extended course of instruction. Did he refer to the teaching of horticulture, which, to be intelligently and systematically done, must be based upon a previously acquired knowledge of botany? Did he mean the subject of plant nutrition, in which the instruction is always halting and unsatisfactory, if the student knows no chemistry? Or animal nutrition, to the proper consideration of which must be brought more than a smattering of chemical and physiological information? I believe I am fairly familiar with the list of subjects that could properly be placed in a four years' course in agriculture, and I know of no one which does not seem to have its position as closely indicated as is the case with many mathematical and language subjects, and with some subjects the logical order is almost imperatively fixed.

The statements and conclusions lead to a wide range of questions which we cannot discuss here. I will briefly notice one, however. Have the schools of lower grade and the short course in agricult-

ure, such as the "dairy course," no justification? They are abundantly justified both by what the four years' course has failed, and always will fail, to accomplish, and by the actual results which have followed their introduction. They are reaching young men who otherwise might never have had their thought stimulated to greater activity or their eyes fitted for larger vision. They are not ideal. They are not a full substitute for the four years' course, but I am of the opinion that as a means of carrying to the mass of farmers a higher appreciation of exact knowledge, they are likely to constitute the most efficient school effort that we are now attempting. I do most emphatically protest, though, against these briefer courses being regarded as an acknowledgment that the higher and fuller course lacks form and efficiency. The logic of such reasoning is not clear, and scarcely requires comment.

Passing now from that phase of our subject which relates chiefly to the college professor and the investigator, let us consider the need of conservatism in the interpretation to the farming public of its relation to scientific facts and theories. In this particular field of work, aside from the station bulletins, we have to do chiefly with the institute speaker and the editor.

In order that the farmer may be instructed and helped, and not confused, these two popular teachers should display a conservatism that is born of sound and adequate knowledge.

Institute speakers as we now find them include men of a great variety of experience. Today we listen to the man of science and tomorrow to the man of practice, both of whom have their peculiar place and value. It is extremely desirable, however, that the one shall not attempt to occupy the province of the other. While there is an occasional scientist who is familiar with the methods of practice, and a few who till the soil that have a fairly wide range of scientific knowledge, the rule is that the one falls far short of expertness in the domain of the other. It is better that the specialist in some line of agricultural practice shall not feel called upon to furnish a scientific explanation of all that he does, and that the speaker who is expert mostly in some departments of science shall not give too much free advice in regard to the details of farm work. Such a regard for the proprieties will tend to the establishment of greater confidence on the part of the public in those who appear in the capacity of teachers.

It is to be feared, moreover, that there is a tendency to gauge the value and efficiency of an institute speaker chiefly by his ability to amuse an audience, rather than by his credentials for sound and accurate knowledge. This is partly due to the fact that many audiences of farmers are better satisfied with amusement than with an address which requires close and earnest attention. It is certain, however, that just as we now confess the disaster due to the incapacity of religious teachers whose only claim to confidence is a sanctified ignorance, so we can be sure that glibness of tongue is not all the qualification which teachers in Agriculture should possess.

An error may be as effectually presented from the platform as a truth, but it is of vast importance to the hearer whether it be error or truth. A truth expressed in homely phrase is at least harmless and may be beneficial, but an error attractively uttered is always dangerous and may work injury. It is not an exaggeration to declare that some very grotesque science has been proclaimed at farm institutes by men who were out of their proper spheres of discussion, and who therefore lacked the exact knowledge necessary to accurate and reliable statements of a scientific character. This evil it is within the power of those who officially conduct public agricultural discussions to greatly remedy.

We will now consider somewhat briefly the relation of the press to scientific agriculture. What the agricultural editor most sorely needs is not only a conservative mind, but the ability to discriminate between the true and the false, — an ability which does not proceed from a ready and attractive style of writing or from what we in general term the art of journalism, but from a fund of information.

The number of agricultural papers, and papers which have an agricultural page, that are offered to the reading public, is legion. To some of these the farmer is greatly indebted. They are conducted by competent men, who summarize for the readers the best knowledge and thought that are current. Some of them, however, present an aggregation of fact and theory which is without form or comeliness when viewed in the light of truth. Especially remarkable, and to the informed mind exasperating, is the hash so often found in the agricultural page of the religious newspaper, put there, we suppose, because the editor feels it his

duty to illumine a benighted agriculture at the same time that he rescues an erring soul.

There is a great opportunity, though perhaps not yet a great demand, for men especially trained to be editors of agricultural newspapers. These should be men who possess the fundamentals of science and practice, and while they may not be experts in any one direction, they should be so well acquainted with the sources of knowledge and with the status of men and things that they can sift the chaff from the wheat.

This is not a plea for an aristocracy of knowledge based upon an orthodox training in school or out of school, or upon a required assent to the recognized *credo* of science or practice. It is not to be expected that even men of acknowledged authority shall all bring their views to the same dead level, but it would be a relief if we could eliminate from public discussion those speakers and writers whose chief claim to a hearing is that they disagree with the accepted verdicts of science and practice, not because they have had the opportunity exhaustively to examine the foundations upon which these conclusions rest, but rather because, after a superficial observation of the surface of things, they are not able to reach the same conclusions. The theories which these pseudo-scientists weave out of the tissues of their own brains, though generally short-lived, may not only mislead, but do great harm by destroying confidence in the science that is worthy of the name.

It may appear somewhat superfluous to suggest that there is need for conservatism on the part of the farmer, for he has been repeatedly pointed out as an example of excessive caution in the adoption of new ideas. Certainly he has sometimes assumed an attitude of even extreme reserve towards things scientific, and although the best farm practice furnishes abundant evidence that the discoveries of science have taken a firm hold upon the means and methods of agriculture, yet he is disposed carefully to question any new theories or change of practice that is presented to his attention. Such conservatism is wise. The farmer is receiving a great deal of free advice from a variety of sources, which, as we have tried to show, is not always reliable, and until by inexpensive experiments, or by less expensive observation, he secures reasonable proof of the value of a new method or appliance, he does well to adhere to his old and tried ways.

The peculiar characteristic pertaining to the farmer's conservative habit is that it occasionally suffers unfortunate and costly lapses. The owner of generous acres will often resist the teachings of science and experience, and will sneer at the advice of the ablest men in his own calling, only to grasp at the glib promises of the man he never before saw and of whose trustworthiness he knows absolutely nothing.

We find in farm homes, as we find everywhere, a strange expectancy concerning things new and untried. Humanity has always been hoping that out of the land of magic would come the relief from the burdens of life, or the promise and fulfillment of great rewards from little effort. The fraudulent food and fertilizer, the patent medicine, and the wonderful business opportunity which offers a chance to get something out of nothing, all exist because of this unconfessed faith in the extraordinary value of the unknown. It is this credulity concerning things outside the farmer's ordinary experience that renders it so difficult to defeat the schemes which only defraud.

It was not long ago that the farmers of New England paid forty dollars per ton for diatomaceous earth with which to strengthen the stalks of wheat. Even within a year some of our Maine farmers were almost convinced that a certain business concern had so interpreted Nature's methods that it had compounded a fertilizer of whose concentration of power the ordinary manufacturer of fertilizers never dreamed, and it was not easy to dislodge this half-formed confidence in a mixture possessing such unusual properties. Very recently, it was my own duty to warn the stockmen of my State not to put their trust in a certain class of foods, containing constituents of such pretended efficiency that their use would solve the difficulties of profitable stock feeding, by insuring the animals against disease and by stimulating growth and milk production to an unusual degree, and I have not found it easy to convince the public that the knowledge never possessed by the ablest veterinarians and that the food properties never discovered by science, nor revealed to previous human experience, are to be distrusted. Within the present year the efficient and courageous secretary of the Maine Board of Agriculture has had a sharp and prolonged contest with certain Western promoters, who for selfish reasons have been trying, with some degree of success, to convince the dairy-

men of Eastern Maine that through the investment of a generous sum of money they could accomplish results contrary to all business experience and the best knowledge, and he has found that he did not undertake an easy task. Gradually, to be sure, the agricultural public is becoming emancipated from the disastrous influence of the schemer, but there is still need that the Experiment Stations and Boards of Agriculture shall hedge about with all possible safeguards that class of workers who lack the expert knowledge necessary for detecting the false.

No one is infallible, no scientist has attained more than a very incomplete knowledge, and mistakes are a common experience, but we confidently assert that the highest realizations in agriculture lie in the conservative yet broadening influence of the scientific effort that is now being exerted in its behalf.

Discussion.

In the course of his lecture Professor Jordan remarked that underlying all practical matters are principles touching matters of investigation and education. No Experiment Station can ever exemplify, in that broad sense which is required, any new principle. Engineers make use of rules. A book of rules might be written which would be useful to this man but not to that.

He had met six or seven hundred Maine farmers, and their questions had not been how to hoe or shovel or run a machine, but, What is the reason for this or what is the cause of that? In a six weeks' winter course, to which any citizen might be admitted, thirteen boys attended, and were as eager for knowledge as the dry earth is for water. We cannot teach them everything, but can stimulate their thirst for knowledge. The course consisted of one hundred and twenty lectures.

Benjamin P. Ware expressed a sense of appreciation of the lecture. He was glad the professor had recognized the duty of Experiment Stations to protect the farmers. There is a degree of gullibility by which they are often misled; perhaps Yankees more than any other men hope to get something for nothing. The foundation of Experiment Stations was by reason of the imposition practised by manufacturers of commercial fertilizers. Farmers knew they must have something to add to their means

of fertilizing and jumped at the offer. Hundreds and thousands of dollars have been spent for ground oyster-shells and other worthless materials instead of ground bone. He rejoiced to know that though we have been so impatient for conclusions, and that Experiment Stations may have put forth premature results, yet they have effected great savings to the farmer. We now feed balanced rations to our stock; formerly we attempted to make milk from hay alone, and grain was looked upon as an extravagant luxury, but things are different today. Plants require balanced rations as well as animals, and Experiment Stations have taught us how to provide them by chemicals in due proportion.

Professor Jordan said that agriculturists are not the only class who need to attend to underlying principles. He was astonished at the ignorance of well-educated people in regard to common things. He spoke of a judge who would not recognize milk separated by separator as skimmed milk. He asked, How do we educate our farmers' wives? The boys are sent to colleges. Girls study mathematics, French, and the like, with only a little chemistry. When the new home is established, what does the mistress know? A cooking-stove will floor her; she knows nothing of bacteria or the effect of drafts of air, and puts food on the table of which she knows nothing. Children are less rationally fed than animals.

A gentleman told of a neighbor who in making up rations for cows omitted cotton-seed meal, as he was feeding for milk and not for meat. The speaker asked whether cotton-seed meal produces garget.

Professor Jordan answered that hundreds of farmers have been feeding cotton-seed meal for twenty years. Garget is generally caused by something wrong in the management of the cows.

The gentleman said he knew of a man who bought a cow that had been quarantined; he found her down, giving only eight quarts of milk daily; she afterwards rose to fifteen quarts per day. There is much testimony against the use of tuberculin; in many instances the value of cows has been lessened by the process.

Professor Jordan said that quite extended experiments with tuberculin have been favorable. After nine months animals

have been killed, and in each lung have been found encysted tubercles.

A lady said she thought it very shocking that so many of these beautiful animals should be sacrificed. She told of the cures of human consumption which she had seen at her home in Colorado, where the air is so pure and the conditions are so much better than in these coast regions. They never have diseased cattle there, and she did not think it impracticable to send cattle there to be cured.

Professor Jordan replied that he should like to place a few cows, with an incipient disease, under the conditions described.

Mr. Ware spoke of a man who had a cow which he knew was tuberculous; he sold her for ten dollars, and the purchaser took her to the commissioners, who paid thirty dollars for her. In another instance forty-five dollars was obtained for a twenty-dollar cow. Two years ago the owners got one-half the full value of healthy animals for all condemned ones. The law was amended, so that now the full value of a sound cow is paid; this seems to be a premium for rascality.

Thomas Harrison said that the commissioners are bound to compensate for the sacrifice of a cow for the public good.

Henry L. Clapp remarked that the more farmers talk the more they show that they have an eye to the main chance, which is quite right, and asked if this was not an element in the conservatism of farmers.

Professor Jordan answered that he thought Mr. Clapp had gone a little farther than he intended. In feeding or fertilizer experiments we are working with materials that we do not understand. He would not discourage the eye to the main chance.

Mr. Clapp thought boys are wanted to go into business as soon as possible, and their parents do not consider their environment.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 25, 1896.

A meeting for Lecture and Discussion was holden at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following is an abstract of a paper read by the author:

Stove Plants in their Native Tropics.

By Professor George L. Goodale, of Harvard University, Cambridge.

In the language of horticulturists, stove plants are those which require a high degree of heat and moisture for their most thrifty growth and their best estate. Without any exception worth mentioning, such plants are natives of the tropics, and it is the endeavor of cultivators to give them conditions of a tropical climate. But it must be clearly understood that within the tropics there are two distinct types of climatic conditions: one characterized by abundant moisture in the soil and atmosphere, and the other by great aridity. In fact, some of the larger deserts lie within the tropics, and yield to our greenhouses only a few plants from their oases. It is merely the difference in the amount of water that makes the difference between any oasis and the sterile waste around it. It is, therefore, only with the plants which are native to the moist parts of the tropics that we have to deal when we examine the vegetation that we confine to our hothouses or "stoves."

Near the equator there is a somewhat irregular and interrupted belt, which runs as a zone around the very warm, moist parts of the earth, and within this zone there is a nearly equable climate. North and south of it there is a dry season, followed by a rainy one, but in the equatorial belt one day is much like every other through the year. The temperature at night is always high enough to insure the best conditions for the growth of plants, and thus to utilize to the best purpose the materials which the green foliage has been preparing during the hours of daylight. Green plants are so many factories for the manufacture of starch and other food and building matters in their structure, and this work goes on only in the light. The only materials needed in this work are carbon-dioxide, commonly called carbonic acid, and water, with small traces of mineral substance, such as salts of potassium, calcium, and magnesium, together with more or less nitrogen.

It is plain that in the tropics, as in our best managed stoves, plants are well provided for all their wants, and all they have to do is to work in the sunlight, and grow at night. There are no climatic foes; all the foes are the competing plants, or the animals at every point. To compete successfully with the one and to resist the other, demands most varied forms and characteristics.

Hence in the tropics we find marvellous diversity of shapes and adaptations, and from this comes the difficulty of understanding that there is a unity which connects even the most varied forms.

The structure of plants may be illustrated by the architecture of buildings, in which the elementary factors are walls, floors, and roofs, to which we might add chimneys and windows. These are found in cathedrals and wayside shrines, in palaces and cottages; however much they may be disguised by decoration or by extrinsic additions of every kind, we can still recognize them and compare them with each other; we can penetrate the most complete disguise, and recognize them even when they have outlived their usefulness and exist only as ornamental vestiges, like make-believe chimneys or false windows. The recognition of these simple elements of architecture is not always easy, but it is always worth while, for we are thereby enabled to trace relations between the most widely separated structures, and to gain some insight into the order of their development. We can even see how the wayside shrine grew into a cathedral, and we can trace the steps by which the development has passed along its course. The recognition of these elements is of further use in such study, since it shows that form is, within certain limits, independent of material, and that whatever material is used must be so disposed that its burdens are kept within its strength. This illustration may now be applied to plants and their underlying architecture.

It is everywhere held truly by botanists that the different organs of all flowering plants are referable to root, stem, and leaf. Here we have the floor, the walls, and the roof. Perhaps root-hairs deserve the same rank, but for the present purposes we must restrict ourselves to the root, stem, and leaf, or even to the more essential stem and leaf.

This reduction of all parts of a flowering plant to such simple elements was the discovery, or rather inspiration, of the poet Goethe, who saw in a misshapen rose, with green leaves where there should have been fragrant petals, the reading of one of the riddles of nature. About the same time — the close of the last century — Auguste de Candolle, a botanist of the highest rank, was led by a careful comparison of the arrangement of leaves on stems with the parts of the flowers, to the conclusion that the flower is a shortened branch, with its parts arranged in an orderly manner, and adapted to special uses. At first botanists were

rather slow to make use of this clew through the otherwise trackless labyrinth of forms, but it is today in the hands of even the students of elementary botany, who can see in the fields of ripening wheat, with its ears of golden grain, leaves, and stems, and roots — all much diversified; and in the blue flax, the scarlet runner, and the rose, leaves and stems and nothing more; and so in all the kindred of those plants which luxuriate in the tropics.

Roots and stems are seldom so greatly disguised as to elude immediate identification, but sometimes leaves are so changed from the familiar type as to defy detection except after close study. But when we have made out the elemental parts and have reduced our otherwise bewildering complex fractions of the vegetable world to their lowest terms, we have before us the materials for working out the family history of plants. Before this subject was made clear by the luminous suggestions of Darwin and Wallace, the expression, "affinity in plants," was a figure of speech rather than an expression of an undoubted fact. How could this be otherwise when all held that species had come down to us in straight lines without any variation wide enough to carry one species beyond the limits which marked it from its nearest neighbors? But in the light of the hypothesis of derivation these lines are seen to be anything but straight: they are tortuous beyond belief, and in their irregular course mark the crooked path of descent.

Therefore, we hold now that these widely separated plants in all climates are, in the truest sense of the word, akin, and if we may borrow a phrase from the sister kingdom, they are of one blood. This belief lends a new charm to all examinations of the diversified organs of plants, and gives to botanical study the attractiveness which attaches to all life histories.

The lecturer next passed to new views acquired in regard to the structure of these plants. Everbody knows that plants are composed of myriads of minute compartments, different in shape and office, which are so combined as to make the organs and constitute the plant. In these compartments resides the living matter or the protoplasm, in which all life is manifested. Up to about fifteen years ago, it was held, on what was believed to be satisfactory evidence, that the living matter in each one of these cells or compartments, was quite separate from the living matter in

the contiguous cells, but better means of research and improved methods have shown that in some cases, and probably in all, the protoplasm in the cell communicates through an inconceivably fine, sieve-like partition with the protoplasm in the neighboring cells, and thus throughout the whole plant there is absolute continuity. Each plant, no matter how complex, is in all its living parts bound strictly together into a coherent coöperating whole.

The bearing of this on the question of propagating plants by cuttings or buds is very important. When a bud is transferred from one plant to another or to favorable soil, and there takes up its life as if it had not been severed from its source, it carries all its ancestral peculiarities with it. If, however, as in the case of the seed produced by the action of the pollen from one modified leaf, called a stamen, on the germ in the ovule or essential part of another modified leaf, there is lacking that close continuity — there is given a chance for variation to come in, and herein the seed differs from the bud. In this field of investigation much is to be done with respect to the perpetuation of acquired characters and those which are more obviously inherited.

At this point, said the lecturer, we may take in review the diversified plants of the tropics and note their peculiarities in their homes. But before passing to the illustrations we must note two points as of the highest importance. First, the showy plants in the tropics are much scattered and are not striking for brilliancy. If you want to see tropical plants at their best you must not visit a jungle, but must see such a stove as that of Mr. Hunnewell at Wellesley. Here, and in similar places, are gathered the treasures from many places in the tropics.

Again, in the tropics stove plants are not so thrifty as under the care of our most intelligent gardeners at the North. Here, under glass, all the caprices and eccentricities of plants are humored, and the plants consequently thrive better than they do where, in the tropics, they have to shift for themselves.

Professor Goodale gave a large series of stereoscopic illustrations of the finest tropical plants in their jungles and glens, and closed by deploring the fact that it is impossible, even in our largest Northern stoves, to bring the largest tropical plants to their finest and most characteristic condition.

The following were among the most striking of the very large

number of views of tropical plants shown by the lecturer. They are not here taken up in precisely the order in which they were exhibited. Palms were illustrated in great variety, both in their isolation and in groups. About twenty of the most prominent species were referred to in detail. Of the banana type, the most surprising was the traveller's tree at Singapore. Bamboos of all sizes were presented under their varied conditions. These and the climbers were of surpassing beauty and interest. Of epiphytic plants, aroids and orchids were shown as they occur in their native homes, and they served to emphasize the point made by the lecturer that in frequency of occurrence and in brilliancy, tropical blossoms, except on the tree-tops, do not compare with our north temperate vegetation. Perhaps the fruit trees of the tropics were as instructive to the spectators as any other of the illustrations exhibited, because in our stoves these so seldom come into bearing and are so seldom seen. The large number of pictures followed each other in very rapid succession, but with sufficient explanation to make them instructive and interesting.

Professor Goodale concluded by speaking of Berg's Physiognomy of Tropical Vegetation in South America, — on the River Magdalena and in the Andes of New Granada, which he had seen in the Library of the Society and which he recommended as a valuable supplement to his lecture.

BUSINESS MEETING.

SATURDAY, February 1, 1896.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The President, as Chairman of the Joint Committee on the Building, reported the following vote adopted by that Committee at a meeting on the 22d ult., a copy of which had been sent to every member of the Society, with notice that it would be presented at this meeting:

Voted, That the Joint Committee on the Building recommend to the Society that they give the said Committee power to offer the property now occupied by the Society for sale, provided that they can obtain a satisfactory price.

After a full discussion of the subject, by a large number of members, the following vote was passed:

Voted, That the Society adopt the recommendation of the Building Committee, and give that Committee power to act.

Charles E. Richardson, Treasurer, read his Annual Report, approved by the Finance Committee, which was accepted and referred to the Committee on Publication.

The following-named persons were appointed by the President a Committee on School Gardens and Children's Herbariums for the year 1896:

Henry L. Clapp, Chairman,

Mrs. Henrietta L. T. Wolcott,	Mrs. P. D. Richards,
George E. Davenport,	Miss Katharine W. Huston,
William P. Rich,	W. E. C. Rich.

It was moved that the President appoint a Committee of three to prepare a memorial of the late Charles M. Atkinson. The motion was carried, and the Chair appointed as that Committee Patrick Norton, Frederick L. Harris, and Kenneth Finlayson.

The same motion was made with regard to Hon. John P. Spaulding, and this motion also was carried, and the Chair appointed the Committee as follows: Joseph H. Woodford, Hon. George Heywood, and Edwin A. Hall.

A letter from Samuel Henshaw, Secretary of the Boston Society of Natural History, inviting the Society to attend a lecture by Herbert Lyon Jones on the "Biological Adaptation of Desert Plants to their Surroundings," before the Society of Natural History, on the evening of February 5, was read. It was voted that the invitation be accepted, and that the thanks of this Society be presented to the Natural History Society therefor.

CHARLES WELLS HUBBARD, of Weston,

having been recommended by the Executive Committee for membership in the Society, was on ballot duly elected.

Adjourned to Saturday, March 7.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 8, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

SEED CONTROL: ITS AIMS, METHODS, AND BENEFITS.

By GILBERT H. HICKS, of the Division of Botany, United States Department of Agriculture, Washington, D.C.

It seems like a waste of time to call the attention of the farmer, gardener, and fruit grower to the importance of planting good seed. From the remotest period it has been known that men cannot gather grapes from thorns or figs from thistles, and yet this is being attempted to a considerable extent in American husbandry every year.

Many farmers are dissatisfied with the low prices their products bring, with high tariffs and low tariffs, with the weather, and multitudinous other unfavorable conditions for profitable agriculture; yet only a few — a surprisingly small number — attach due weight to the fact that one of the very foundations of success for them is pure seed, germinable and true to name. It is unquestionably true that the present conditions in this country, including the sharp competition with both home and foreign products, render the profitable pursuit of agriculture exceedingly precarious, at least in many cases. I believe, on the other hand, that it is equally true that by proper attention to business, by using the best seeds, the best soil, and the best methods of cultivation and marketing, every farmer and gardener can make for himself a comfortable living and by proper frugality accumulate a substantial store for future necessities.

It is urged that there is already a plethoric yield of agricultural products, — more than our markets demand. While this may apply to inferior or mediocre articles, it does not hold good for those of the best quality. Every year sees a larger demand for first-class vegetables, fruits, and cereals. Americans of the present time are living more highly than they used to, and are willing to pay high prices for the best table luxuries.

The man who raises the best crops, then, is coming out away

ahead of his neighbors who are content to "make a living;" indeed, the time seems to be fast approaching in America when the husbandman who does not apply brains as well as fertilizers to his fields will not be able to make even a living.

The listlessness which exists in some quarters at present must give way to intensive application of the right sort. The trouble is not that the agriculturist does not work hard enough, but that in many cases his labors are misdirected and futile. Of what use is it if a man works a piece of ground early and late, in season and out, if he plants tares when he wants wheat?

Some of the conditions for successful crops are beyond the control of the producer, but such conditions are being gradually lessened.

In the matter of good seed it would seem at first sight that any one could obtain it by paying the price asked. Indeed, some American seedsmen would have us believe that it is difficult in this country to procure any other kind, — that all of the trashy seed of which we read is sold in Europe.

We wish to state at the outset that we have no grievance whatever against American seedsmen as a class; that the trade numbers as honorable men as can be found in any profession; and our remarks at this time will apply only to the abuses of the American seed trade, from the wholesaler down to the hardware merchant or grocer in a country village, who sells his customers old garden seeds that not even the trump of Gabriel could induce to come up.

It makes no difference to the farmer whether his seed comes directly from the large dealer or from the village merchant, if it does not germinate or turn out to be what he ordered. He does not stop to quibble over the point made by a recent writer in an American journal, that a man who sells bad seed is not a seedsman. If this be true, we shall have to get new names for the butcher who sells tainted meat and the grocer who adulterates his wares.

After a careful study of this subject, including the testing of a considerable quantity of seeds and conversation with some of our prominent seedsmen, I am prepared to state without fear of successful contradiction, what any one may easily find out for himself, if he takes a little trouble, that there is an immense amount of trashy and inferior seed sold in this country every year, and we believe the time is fully ripe for the inauguration of seed con-

trol methods in the United States. Such methods would benefit the first-class seedsmen fully as much, if not more, than the consumers themselves.

As it now is even the man who pays a high price for seed cannot always get it, though, on the other hand, it should be noted that some farmers get poor seed because it costs less than a good quality, and therefore they consider it cheap. No intelligent man needs to be told that such seed is dear at any price, and likely to entail a long series of losses from the fouling of his land and the introduction of inferior strains of agricultural plants.

Poor seed may be classified as follows:

1. Impure.
2. Not true to name.
3. Of low vitality.

Impurities may be either accidental, due to imperfect handling or cleaning, such as weed seeds, chaff, dirt, and foreign seeds; or the result of deliberate fraud, as "killed" seed, artificially colored sand, admixtures of seeds of inferior value, etc. If the impurity consists only of inert matter, *i.e.*, sand, chaff, and "killed" seeds, the wrong lies in the fact that the buyer pays for something which is of no value, but which cannot injure his land or crops. On the other hand, where seeds of weeds occur the farmer not only sows but carefully cultivates plants which are not only usurping the place of the crops he desires, but may even poison his family and stock. This last statement is an extreme case, but one not at all uncommon.

If the seeds are not true to name a great loss is entailed to the farmer from the fact that an entire crop, with all the cost and labor it implies, has been wasted. However, in cases of this kind, *e.g.*, if a gardener plants a field to some particular variety of radish and it turns out to be totally different from the kind ordered, the buyer has heretofore had redress by claiming damages against the seedsman for obtaining money by false pretense. Numerous cases of this kind have occurred in America, but dealers are usually careful to avoid such difficulties.

With regard to weed seeds, upon which much stress is laid by Seed Control Stations, it is possible that their baneful effects are sometimes overestimated by those forming an opinion on the value of commercial seed, judged from the standpoint of the

germination of the former. Experiments conducted with a few kinds of weed seeds tend to show that the seeds of some of our native plants produce a small number of seedlings as compared with those of cultivated plants. A large number of our worst weeds are perennial and, although they produce seeds, do not depend upon this method for self preservation; hence their seeds frequently show a small germinating capacity. A very large proportion of our serious annual weeds, on the other hand, produce enormous numbers of seeds, apparently upon the principle that, in some cases at least, but few of them will germinate. Again, the conditions of germination of many weeds seem to be different from those of cultivated plants, in that the seeds of the former often require a long period of rest, and perhaps, also, alternate freezing and thawing, before they will germinate.

However, in such cases, while the injurious effects may not be seen immediately, the weeds are likely to appear in future crops, when least expected. Professor Goff, of Wisconsin, found that seeds of "Redroot" (*Amaranthus retroflexus*) would not germinate at all when fresh, but after being kept for several years in a bag in a dry place they sprouted quite well.

On the other hand, Dr. J. C. Arthur, after conducting a test with various weed seeds at the New York Experiment Station in 1887, came to the conclusion that some species became incapable of germinating after being kept dry three or four months, and therefore he thinks that the danger of fouling land from sowing weed seeds with farm or garden seeds is not so great as commonly supposed. Seeds of Russian thistle, collected October 30, were tested in our laboratory the following May. After fourteen days but 15.5 per cent had germinated. Seeds of the same species one year and a half old failed to sprout at all during the same period.

The truth is that too little work has been done along this line to warrant any definite conclusions. There is a field for study here which is well worth the attention of those engaged in Seed Control. In general, however, it may be said that no seed should be sold which contains as high as five per cent of weed seeds.

In making reports on impurities, the European Seed Control Stations take into account the kind of weed seeds present in a sample. For example, in the Scandinavian Stations the following, among others, are reckoned as "bad" weed seeds: cockle,

chess, Canada thistle, dodder, wild mustard, sow thistle, creeping buttercup, wild chamomile. Such seeds, though they may be scarce in a sample, would readily spread throughout a field. In the case of dodder, Russian thistle, and some other weeds, no commercial seed is worth sowing if it contains a single seed of these species which is capable of germinating.

The third cause of poor seed, namely, low vitality, furnishes the greatest argument for seed control. In this respect the buyer, under present conditions, is most likely to be defrauded, and in such a manner that it is very difficult for him to obtain redress.

Most people judge of the germinating quality of seed from its appearance. If plump, sound, and glossy it is presumed to be germinable. Some go so far as to throw a handful of seed upon a hot stove; if it pops open suddenly it is supposed to be good. Others test their seed by placing a small quantity in water; if it sinks it is thought sound; if it floats it is considered dead. Neither test is at all satisfactory. In the latter case a layer of air closely enveloping the seed often keeps good seed afloat, while poor seed may sink as readily, since the specific gravity of seeds is greater than that of water.

The appearance of seed cannot be relied upon in forming an estimate of germinative ability. An artificial gloss is often given to seed in the process of cleaning. Modern seed-cleaning machinery is constructed not only to take out foreign matter, but also, in many instances, with attachments which clean the surface of the grains. The rubbing of the seeds together, of itself, gives them a glossy appearance. Sometimes polishing brushes are used with the express object of making old seed look like new. Cases are even known where seeds have been rubbed against oiled surfaces for the same purpose.

Without stopping here to discuss the subject of possible injury to the seed coat which any artificial treatment is likely to produce, — a belief which prevails among the best seedsmen of the country, for which reason such seedsmen do not use polishers, — it is evident that a glossy surface affords no certain criterion of the vitality of seed. Furthermore, there is not always strict uniformity in the color of seeds, even of the same variety. Dull-looking seeds often germinate better than shiny ones of the same species. Nevertheless it is true that some seeds, especially the

clovers, rapidly lose their bright color with age; hence in some instances the color test, to the eyes of an expert, is very useful. However, the most practised eye is readily deceived in this respect.

In the matter of vitality the buyer of seed is at a great disadvantage. The dealer usually claims that with proper conditions seed of a considerable age will germinate well. If one purchases seed and it does not come up, the seedsman coolly tells him that it was not the fault of the seed, but of the manner of planting, state of the weather, etc. Most of them in their catalogues take particular pains to emphasize this statement. The dealer says his seed is good, for he has carefully tested it and knows its viability.

Furthermore, the seedsman tells us that, on account of the lively competition in the trade, no man can afford to sell seed of a poor germinating quality, since he would lose his business. How is it, then, that so much badly germinating seed is sold to American farmers? This question is not so difficult to answer as one might think.

The seedsman is in the business for what he can get out of it; he has seed to sell, not to throw away. Like people in all other kinds of trade, he is often caught at the close of the season with much old stock on his hands. Does he test this at the beginning of the next season, and, finding that the germination has decreased ten or twenty, perhaps fifty per cent, sell it to the farmer at a corresponding reduction? There may be such instances, but they are certainly the exception and not the rule.

On the other hand, like a grocer or merchant in the same predicament, the seedsman frequently works off his old stock to the best advantage. This is a common practice, and it is no secret at all among the trade. One of the most prominent clover seed dealers in the United States admitted to me that he sold old clover seed in this way. In other words, if it was not too old he made no discrimination to ordinary customers, but if he found that its germinating power was pretty low he mixed it with fresh seed in whatever proportions it would stand. I have talked with quite a number of seedsmen in the country upon this point, and have yet to learn of one who throws away all of his old seed or sells it to the public at a lower price.

Of course, seedsmen themselves do not pay as much for old

seed as for new if they can help it, but in many cases no difference is made in the small lots sent out to the people, except that care is taken to mix in enough fresh seed to render the sample salable. This, to a large extent, accounts for the fact that rare vegetable and flower seeds often show a remarkably low vitality — a more or less frequent experience of every horticulturist and farmer. In ordinary seasons of business the common seeds move rapidly in trade, but the rare sorts are apt to be left over from year to year. The fact that such seed always costs more than the ordinary varieties makes the evil a very exasperating one.

To obviate, at least in a measure, the troubles arising from planting seed of low vitality, the seedsman frequently advises his customers to sow more seed per acre or rod than experiments have shown to be necessary if fresh seed were used. In fact, I may say, that with the present inadequate knowledge of seeds in this country, where the matter of prudence and economy has not entered into horticultural practices to the same extent as in Europe, there is very often an unnecessary waste in seed-sowing. Better pay more for good seed and sow only what is necessary. Labor will be saved both in the sowing and in thinning out the seedlings. This last point is a very important one where field or garden crops are raised upon a large scale.

If the seedsman would sell two pounds of seed which is fifty per cent below the proper germinating standard at the same price as one pound of standard seed, the dishonest practice — I call it by its right name — of selling low germinating seed would be greatly lessened, but such is not the case.

When seedsmen are asked to guarantee their seeds they make statements like the following (I am quoting now from the catalogue of one of the oldest and most reliable seed firms in the United States):

"Seeds of the best possible quality will fail through improper treatment. Thus, if a small seed be sown so deeply that the young plant cannot reach the surface, the seeds, however good, will fail. More failures result from a want of proper knowledge of conditions necessary to germination than from bad quality of seeds themselves. Besides the conditions" (which are stated) "affecting the germination of the seed, the young plants, after they have made their way to the surface, are liable to various accidents; a sudden current of very cold air, or a continued dry-

ing wind, may check their growth, or destroy the young plants altogether. In addition, there are numerous insects, both below and above ground, that may attack the plants, some of these being so small that they often destroy a crop before they are discovered.

"For the above reasons, we wish to state in this explicit form, that, while we exercise great care to have all seeds pure, reliable, and true to name, our seeds are sold without any warranty, expressed or implied, and without any responsibility in respect to the crop. If our seeds are not accepted on these terms, they must be returned at once."

The above is a fair sample of the kind of guarantees (?) offered by American seedsmen in general. Others, however, warrant seed to be of good vitality and true to name to the extent that they will refund money if not. Strange to say, however, the largest firms almost without exception expressly state that they will furnish no guarantee expressed or implied. But no guarantee from any firm whatever can take the place of an actual test made by a disinterested party.

No one asks the seedsman to guarantee a crop; that would be absurdly unreasonable. Neither, under seed control conditions, is it required that the seeds should come up after being planted in the field. As we shall see presently, in making germination tests the seeds are placed under the most favorable conditions and handled by experts from first to last, so that none of the common objections of seedsmen hold good, that no guarantee can be expected since "the very best seeds do not always give satisfaction on account of sowing too deep or too shallow; too wet or too dry soil; wet weather, cold weather, frosts, chemical changes induced by temperature, etc."

The conditions which affect germination are very complex, and the subject is a very interesting one, but we cannot treat it here. Suffice it to say that not only do different varieties of seed germinate best under conditions different from those of other varieties, but also that differences in season, climate, soil, and locality, difference in the degree of ripeness when harvested, and methods of harvesting and keeping, make it impossible to predicate with absolute accuracy how different seeds of the same variety will behave when they are planted. Nevertheless, the germination of our common garden and forage plants is sufficiently understood by

those who have made a study of the subject, to warrant the adoption of certain standards below which good seed ought not to fall.

As to the vitality of seed, it may be confidently stated that, with possibly a very few exceptions, the germinating power of all cultivated seeds deteriorates after the first or second year, and after three or four years, often after the first, this deterioration is usually very marked. In a few cases, such as cucurbits and flax, it is commonly supposed that seed of two or three years from harvesting is better than fresh. Dr. Wittmack says that the common grass seeds, if properly kept, retain their vitality two or even three years, although, as with clover, one year seed is preferable. He might have added, "if fully ripe when harvested," since most grass seed contains a large per cent of immature grains; a difficulty which is entirely unavoidable in many cases. Hard-coated seeds, such as the clovers and their allies, if kept in a dry place, usually retain their vitality better than seeds of a softer consistency.

Many vegetable seeds lose their vitality in a short time. Here, as in the case of all seeds, great variation exists. For example, in a large series of tests of vegetable seeds made by Professor Goff at Geneva, N.Y., in 1886, it was found that "two germinations of turnip seed seven years old gave ninety-eight per cent of growth, equaling the result to be expected from fresh seed; one sample nine years old, gave sixty-two per cent." But in the majority of instances, the old seed failed to come up well.

It is not necessary to take into account at all the supposed limits of vitality of the different varieties of seed in considering the subject of seed control. What matters it to the gardener if the highest authority in the world tells him that cucumber seed will germinate when it is ten years old, and the seedsman satisfies him that the seed is within that limit? As before stated, the only guarantee worth anything to the buyer is the result of an actual test made by a disinterested and competent person.

The necessity for seed control may be more obvious if we give the results of some tests. Although comparatively little attention has been paid to this subject in America, there are plenty of data at hand showing the need of practical reform in the seed trade.

The lowest vitality and purity is found as a rule among grass seeds, among which class of seeds detection of impurities is the

st difficult, not only to the purchaser, but also to the dealers emselves.

No grass is raised in the United States for seed alone, *i.e.*, on a mmercial scale. Most of the seed of Kentucky blue grass, hard grass, timothy, redtop, and meadow fescue used in this ntry is American grown. Some other species are raised here, a greater or less extent, but in no case, so far as I have found, these grasses cultivated for their seed alone, like a seed crop peas or cabbage, for instance. This accounts for the fact that quently large amounts of weed seeds are present in grass ds. Generally no especial care is taken to rid the grass fields these pests, and grass, above all other kinds of seed, is the st difficult to clean after it is once harvested. Besides, our adows generally contain a mixture of various grasses, often of y different value.

Many grasses show an average germination of only thirty to ty per cent, — timothy, redtop, the bromes, orchard grass, the scues, and a few others, being prominent exceptions. The con-ions of the weather at the time grasses flower have a great al to do with their germinative ability. If a prolonged wet son ensues at this time, only a very small percentage of the ds ripen. For example: in Germany, in 1871, only five per cent the seeds of meadow foxtail were germinable for this reason.

Again, the seeds on the same grass plant ripen very unevenly d, in many cases, rattle out easily when fully mature; there-e such seed is usually harvested before fully ripe. Besides, glumes of ripe and unripe fruits are often so nearly alike in or that it is difficult for the collector to distinguish between em. Hence it is no wonder that pure and germinable grass d is so hard to obtain. The cheaper grades are mostly chaff d dirt and worse than useless, while those designated "prime" d "fancy cleaned" are often of very little value.

Nevertheless the following table will show that grass seed of igh germinating ability may be obtained in our markets. The ures in the first column are quoted from the price list of a dsman in the United States and are the results of germinating ts of seed offered for sale by him. It will be noted that these ures are in every instance considerably higher than those of second column, which are the standards of germination used Dr. Stebler, director of the Zurich Seed Control Station.

Grass Seed.	American Seedsman. Per cent.	Zurich. Per cent.
Redtop	95	85
Crested dog's tail	85	60
Orchard grass	95	70
Tall meadow fescue	90	70
Sheep's fescue	90	50
Italian rye grass	90	70
English rye grass	96	75
Reed canary grass	85	60
June grass	70	50
Rough stalked meadow grass	80	50

The seedsman adds, however, that these percentages are given as information only and not as a guarantee.

The purchaser ought not to suffer from the fact that, on account of the unfavorable conditions above mentioned, good grass seed is difficult to procure. The dealer should test his seed carefully, and sell it according to its real value. If the buyer is not willing to pay more for such seed than for trash, it is his own fault and he deserves no sympathy.

However, the buyer under present conditions is at a great disadvantage, as the following illustration will show: A sample of seed sold by one of the most prominent dealers in this country for yellow oat grass (*Avena flavescens*), was tested in our laboratory and found to contain 74.4 per cent of impurities, of which over four-fifths was the seed of common hair grass (*Deschampsia flexuosa*), the balance consisting mostly of chaff and weed seeds. Two hundred pounds of this seed was bought by the person who furnished the sample, at a cost of fifty dollars per hundred. Hair grass sells for about ten dollars per hundred pounds, and is practically worthless for lawn or pasture.

The grains of these two kinds of grass are very similar in appearance, and exceedingly difficult to detect without the aid of a lens. The seed of yellow oat grass is imported from Europe, where it is often deliberately adulterated with that of hair grass. It is not likely that the American seedsman noticed the fraud. Of the 25.6 per cent of pure seed, but 11.5 per cent germinated under the most favorable conditions, or a little less than 3 per cent of the entire sample. In other words, there was a loss of about ninety-one dollars out of the hundred which the seed cost,

allowing 100 per cent germination for the hair grass and supposing it to be of any value to the farmer. Of this loss nearly sixty dollars was, in all probability, the result of deliberate fraud upon the part of the European dealers, and reprehensible carelessness, to say the least, in the case of the American seedsman.

Kentucky blue grass showed but 10 per cent germinating power instead of at least 60 per cent, which is a fair standard for this seed. Only one per cent of a sample of Texas blue grass (*Poa arachnifera*) germinated. This grass, like the other Poas, usually shows a low germination, but in the case mentioned the sample was entirely worthless, since when sown in soil not a seed came up. Texas blue grass sells for three dollars a pound in small quantities, or two hundred and fifty dollars by the hundred. Out of four hundred seeds of Bermuda grass but one germinated, or one-fourth of one per cent. Although this grass rarely matures seed in the North, and is generally reproduced by its rootstocks, nevertheless good seed should show a germination of from 40 to 50 per cent, especially in view of the fact that seedsmen ask $1.50 per pound for it whether it comes up or not.

Orchard grass showed a germination of 31.8 per cent in blotters and 24 per cent in soil, as against 70 to 80 per cent, the proper standard. Tall meadow oat grass contained 36.3 per cent impurity, 70 per cent of which consisted of inferior grass seeds and weed seeds, the balance being chaff and dirt. Of the 64 per cent of pure seed 60 per cent germinated, or a little more than one-third of the entire sample.

Awnless brome should show a purity and germination per cent of 90 or 81 per cent intrinsic value. Five hundred pounds of this seed were purchased at regular wholesale prices and a sample submitted to us for test. It showed a purity of 80.8 and 55.5 per cent germination, being an actual value of 44.8, or a little over one-half that of the standard, a money loss of over forty dollars. This does not take into account the farmer's waste of time and labor, besides the injury to his land from sowing the inferior grass and weed seeds of which the impurities consisted.

Italian rye grass tested at the Iowa Experiment Station contained 41 per cent of English rye grass, an inferior plant. This seed comes from Europe and is very often adulterated in this

way. At the same station a pound of orchard grass was found to contain over fourteen hundred seeds of sheep sorrel, besides considerable ergot. Over one-half the bulk of a lot of fiorin (*Agrostis alba*) costing forty-two cents a pound was chaff, and over one-third its weight consisted of chaff and sand. All of the grasses enumerated were sold as good seed, at the regular market price, by prominent American seedsmen.

A test of orchard grass made at the Connecticut Experiment Station a few years ago furnishes a striking example of the need of seed control in this country. Seventeen samples, obtained from regular dealers, were examined. One of them contained no orchard grass at all, but consisted entirely of perennial rye grass, which is very unlike orchard grass, from which it is easily separated. This is an evident case of fraud upon the part of some one, since perennial rye grass is much inferior to orchard grass and costs considerably less a pound. Five other samples contained, on the average, but 25 per cent of orchard grass seed, and of the entire lot only 40 per cent germinated, or less than one-half the standard amount, while in one case the vitality was only 4½ per cent.

The following are the results of some germination tests made by American experiment stations: Redtop 4 per cent, beach grass 2 per cent, meadow foxtail 2 per cent, sweet vernal 5 per cent, tall meadow oat grass 2 per cent, yellow oat grass 2 per cent, soft chess 2 per cent, crested dog's tail 9 per cent, orchard grass 10 per cent, hard fescue 3 per cent, various-leaved fescue 3 per cent, meadow fescue 6 per cent, red fescue 8 per cent, slender fescue 3 per cent, Italian rye grass 4 per cent, English rye grass 12 per cent, reed canary grass 6 per cent, Canada blue grass 11 per cent, wood meadow grass 6 per cent, fowl meadow grass 3 per cent, rough stalked meadow grass 2 per cent.

In the following instances not a single seed sprouted: meadow brome, Schrader's brome, sheep fescue, velvet grass, timothy, water meadow grass, and Kentucky blue grass. We do not know under what conditions these tests were made, and have intentionally selected the minimum results for purposes of illustration, but they certainly afford abundance of argument for the need of seed control in America. The mere fact that such seeds were offered for sale in this country without the purchaser's knowledge

f their real worth is sufficient evidence that something needs
be done for the improvement of agriculture along this
ne.

Since so much of our grass seed comes from Europe let us
rn in that direction for information. The following samples
ere tested last year at the Zurich Seed Control Station and
clude grasses from various parts of Europe. One sample of tall
eadow oat grass contained 31.9 per cent of chaff. Of Italian
e grass one sample contained 85 per cent awnless seeds, a sure
gn of intentional admixture with English rye grass. One
mple of crested dog's tail consisted of 46.3 per cent English
e grass, 46.5 per cent chaff and dead grains, and only 7.2 per
nt pure seeds; another sample contained 78.7 per cent of chaff
nd dead fruits. A sample of meadow foxtail contained 81.8 per
nt chaff and larva-infested grains, while another one showed
t 1 per cent germination.

One sample of tall meadow fescue showed 0 germinating per
nt. Seeds of this grass are usually mixed with those of the
mmon meadow fescue, but no particular injury is done, since
th grasses grow in the same soil. The latter, however, is a
ss expensive seed.

Other fescues showed a remarkably low germination: sheep's
escue and various leaved fescue in one instance did not put forth
single sprout. Red fescue germinated in one case but 6 per
nt. This grass is said to occur pure in the trade but seldom,
eing largely mixed with sheep's fescue and various-leaved
escue.

June grass showed the low purity of 28.5 per cent; germination
8 per cent. This grass is frequently adulterated with *Poa*
mpressa, which in Europe is considered inferior; in fact, one
minent authority classes it as a worthless weed. In America,
owever, it has some value, but flourishes on a different soil
rom June grass. Two samples labelled June grass contained
0 and 70 per cent *Poa compressa*.

Velvet grass was found in one instance to contain 96.5 per cent
npurity, and one sample germinated but 17 per cent. Seed
abelled sweet vernal in some cases proved to be almost entirely
he annual variety, a very inferior, if not worthless grass. This
dulteration is exceedingly common, and almost impossible to
etect.

With the exception of the common meadow fescue and June grass, America depends almost entirely upon Europe for every grass mentioned above, and seeds as worthless as those enumerated are frequently sold in our stores. There is a law preventing America from sending bad pork and beef to Germany, but there is no embargo to prevent Germany and other foreign countries from dumping their poor seed upon our market, a practice which prevails to an alarming extent, accounting in a very large measure for the dodder, Russian thistle, and other dangerous weeds which infest our country.

Grass seeds are not the only ones which are apt to show very low germinating averages. Perhaps, on the whole, flower seeds are still more inferior in this respect. Here I wish to relate a personal incident by way of illustration. One of my very first recollections recurs to a time when my parents, who had gone to a neighboring village to make some purchases, took me with them. As we were leaving a "general" store, I found a ten-cent piece upon the floor. My people were poor, and this was the first money I had ever touched with my own hand, — almost the first I had ever seen. Taking it to the store-keeper he remarked that since the owner was unknown I was as much entitled to it as any one. I need not stop to tell you my feelings, which, however, doubtless those of you who were brought up in the country in humble circumstances can appreciate. Being very fond of flowers it did not take me a moment to decide what to do with the ten-cent piece. Standing before the counter with the most glowing feelings I had ever experienced I called for ten cents' worth of flower seeds. Selecting a package labelled "China Aster," I rode home with great expectations of the beautiful, large flowers which I should obtain from that seed.

My father, having been a practical farmer nearly all of his life, made a flower bed with the greatest care and planted the seeds with equal solicitude. Then I did what thousands of people do every year — waited for them to come up. This was thirty years ago, and not a single one of these seeds has come up yet. The keenness of my disappointment finally turned to disgust, from which I have never fully recovered.

The following germination tests of flower seeds purchased from prominent American seedsmen were made in our laboratory:

Ageratum conyzoides	11.5 per cent.
Double hollyhock	3.3 "
Fine mixed verbena	10.0 "
Japan primrose	0.0 "
Moonflower	0.0 "

A lot of seed bought by us and labelled *Salvia splendens* (scarlet sage) did not contain a single seed of that species. Nearly 85 per cent was seed of a much cheaper and less showy species, both seed and plant being very different from *Salvia splendens*, the seed of which costs about twelve dollars a pound at wholesale. The balance of the sample, 15 per cent, was discolored lettuce seed bearing a casual resemblance to the Salvia, but it had apparently been "killed" so that it did not germinate at all. The whole circumstance indicated deliberate fraud somewhere.

The main reason for the frequent poor quality of flower seeds is the fact that not rarely the same stock is offered for sale year after year. The custom of putting up flower and vegetable seeds in small packets and sending them out in boxes to small storekeepers throughout the country, accounts for a very large per cent of the seed that never comes up. Seed from these boxes is often offered to the public long after it is capable of growing. Much of the flower and vegetable seed received from abroad in bulk, and put up in this way after reaching America, is of a low vitality when our seedsmen get it, and does not improve by remaining in a country store a few years, nor even if it is returned to the seedsman each year, mixed with other seed and sent out in a new box.

Hon. J. J. H. Gregory, the well-known seedsman, in an excellent address delivered before this Society two years ago, speaking of the abuses of the seed trade, said that the agent of one firm acknowledged that a certain package of parsnip seed was on its fourth season's round, although this seed loses a great proportion of its vitality after the first year. He also mentioned a circular received by him thirty years ago from an agent of a firm in the box trade, offering certain varieties of vegetable seed at a wonderfully low price. The agent added that although the seeds were too old to sprout they would do to mix with new seed. Judging from some of the vegetable seed we have tested we are afraid that same agent is still in the business.

As you probably know, many of our varieties of vegetable seed, excepting peas, beans, cabbage, celery, cucumber, and onion, and perhaps a few others, are imported. Such seed, even if of good quality when shipped, sometimes becomes impaired in transit, from dampness or other reasons. On the other hand, on account of the absence of any plan of seed control in this country, the Europeans have an excellent outlet here for their cheap wares, a fact of which they frequently take advantage.

Owing to the methods of culture, as well as their size, form, and weight, vegetable seeds are usually much cleaner than those of grasses and other forage plants. Where seedsmen raise vegetables for seed purposes, they generally take particular pains to keep them free from weeds, a much easier task than in the cases of grasses, clovers, etc. Furthermore, seeds of grasses and forage plants, as a rule, are harder to clean. I am told, however, by one who has been in the seed trade for many years, that there is a good deal of fraud practised by mixing small gravel and sand with vegetable seeds to increase their weight, as such seed is generally sold in bulk by weight. Dirt is sometimes mixed with onion seed, and the excuse made when such impurities are detected that it is impossible to get all of the dirt and stones out of the seed.

Again, "dead" or "killed" seed is sometimes mixed with good seed. An instance, quoted to me by one who was personally acquainted with the transaction, related to a lot of vegetable seed which was received by a certain American firm. The seed proved to be a variety very inferior to that ordered. To make good the loss and avoid detection at the same time this seed was heated until the embryo was killed, when it was mixed with some of the genuine, higher priced variety, and sold as such. Similar instances are reported from Europe and are undoubtedly more common than is generally known.

A few years ago the Maine Experiment Station tested a considerable amount of vegetable seeds bought from American seedsmen. The following are the percentages of germination of seeds obtained from one dealer: Lettuce 0, turnip 4, cabbage 91, parsnip 0, celery 33, onion 0, beet 48, carrot 23, tomato 57, radish 80. Of the ten varieties tested three were entirely worthless, one nearly so, four others below the standard, one nearly up to the proper standard, while only a single variety of them all was what it should have been. I regret to say that in this case a Massa-

husetts dealer sold the seeds. It is unnecessary to offer more roof that worthless seed is sold every year in American markets. a disagreeable subject and one which needs heroic treatment.

The important question is, What are we going to do about it? hall we continue to believe that the evils will regulate themelves in the ordinary course of competition, as the seedsman ould have his customers think? Experience with commercial ertilizers and adulterated food products ought to be sufficient o satisfy the most sanguine farmer or gardener, that competition mong seedsmen is not going to insure him good seed.

More than a quarter of a century ago these same questions ere forced upon the attention of European agriculturists as the esults of some tests of commercial seed made by Dr. Nobbe, irector of the Experiment Station at Tharand, Saxony. Seed ontrol methods were introduced, and as the result there has een a great improvement in the stock offered for sale. Poor seed s on the European market, too, but no man on that continent eeds buy it unless he wants to do so. At the present time there re over one hundred seed control stations in Europe, not a single mportant country being without one or more. Germany heads he list with 38, Sweden has 16, Austria 14, Belgium 9, Russia 7, nd France, England, and Scotland one each. Even Japan, Brazil, and Java have one or more, the total number outside of he United States amounting in 1894 to 117. In some cases his work is conducted in connection with a regular agricultural xperiment station; in many instances seed-testing alone is carried on. The general plans are similar, although considerable ariation in details exists among the different stations. So far s I can learn, there are no laws in Europe compelling seedsmen o furnish good wares, but the result is reached through the ressure of public sentiment, due to the efforts of the Control Stations.

Frequently the work is undertaken in connection with agricultural societies, all of whose members share in the benefits. For xample, every agriculturist in the jurisdiction of the Dresden Agricultural Society is authorized to send in to the Experiment Station at Tharand, Saxony, samples of seed bought by him, together with a statement of their origin and cost.

The sample must be taken and sealed before a witness and be fair average representative of the seed purchased, so that the

dealer cannot dispute the result of the test. Of the smaller seed as radish, rape, clover, grasses, etc., at least one-half an ounc must be sent in, and in the case of larger seeds, as peas, bean cereals, maize, etc., from a quarter to half a pound. The resu of the tests are printed in the official journal of the stati which also publishes equitable standards of purity and germin tion, so that the people may know whether the guarantee of see offered to them is of a sufficiently high per cent.

Seed dealers or producers can have the purity and germinati ability of their seeds examined for one or two dollars, accordi to the size of the seed. Special arrangements are made w parties not members of the Dresden Agricultural Society.

The prices for seed testing vary according to the labor requir and the country in which the test is made. A few of the stati are self-supporting, but most of them receive grants from t State to aid in carrying on the work. In many cases so-call "Control firms" are regular patrons of the stations. They p a certain annual amount for having tests made. To their c tomers they furnish a guarantee for genuineness, purity, a germinating capacity based upon, but not necessarily equal the test made by the station for them, — the "preliminary tes as it is called.

Immediately upon receipt of the seed, the customer can se a sample to the Control Station if desired, and have it tested a reduction of from one-third to two-thirds from prices charg the dealer, or, in some cases, without expense. This is cal the "supplementary test."

The firm binds itself in case its seed falls 5 per cent or m below the germination per cent guaranteed, either to refund money *pro rata* or to replace the goods, paying transportat both ways.

In supplementary tests made for members of the East-Pruss Agricultural Society, if more than 2 per cent of foreign mat occurs above the guarantee, or 10 dodder seeds per kilogr (about 4½ seeds per pound), the dealer agrees to take back goods, paying charges both ways, or, at the option of the buy to refund from 5 to 10 per cent of the cost for every 5 to 10 se of dodder per pound.

Certain conditions exist relating to the amount of seed must purchase to entitle him to free tests; also to the manner

rawing and sending samples, limit of the time of the year when eds can be bought under a guarantee, time for filing claims, c. The methods of procedure are perfectly equitable for both ealer and buyer.

Not only the results of tests, but also the names of the seeds-en are published by the Experiment Station. This acts as a ost wholesome check upon the sale of impure and ungerminable eed, and places the agriculturist in a position to protect himself ffectually against the purchase of inferior stock.

The methods of testing seeds may be briefly touched upon. fter the sample is received by the station a certain portion is eighed out as a smaller average sample. From this the good eed is carefully selected and the percentage of impurity ascer-ained. The impurity is divided into inert matter, seed of oreign cultivated plants, and weed seeds. The latter are identi-ed by means of a type collection of seeds kept in the station aboratory.

From the pure seed are taken a certain number of average eeds for the germination test, which is usually conducted in a asement, where the temperature can be properly controlled. his is done by placing the seeds upon shelves in doubled-walled etal chambers, kept at a constant temperature by means of a hermo-regulator. At the Vienna Station the germinating hambers are heated with hot air. In others the cavity between he walls is filled with water kept at a temperature of 20 degrees . (68 degrees F.). We find the latter method much preferable. rass seeds are usually transferred for six hours each day to nother chamber kept at 30 degrees C. (86 degrees F.), since his daily increase of temperature has been found advantageous.

The seeds are germinated upon damp cloth, asbestos, blotters, orous saucers, or soil. Genuineness of varieties is established y field tests. We make duplicate tests of 200 seeds each, nd in most cases conduct comparative tests in blotters and oil at the same time, often supplementing these with green-ouse tests. In short, the seeds are germinated under the most avorable conditions for the particular species involved.

The seedsman is further favored by the fact that there is a onsiderable difference between germinative ability and *viability*. y viable seeds we mean those which come up through the soil hen planted, while a seed is said to have germinated as soon

as the little rootlet called the radicle pushes through the see coat.

No matter how favorable the soil conditions may be, very ofte a seed which would germinate upon a cloth or blotter will no come up through the soil from inherent lack of vitality alone Of course a seed has no practical value unless it has energ enough to push its way up through the ground, but the very fac that seed planted in the open is subject to so many vicissitude coupled with the fact that the germination tests upon whic guarantees are based are not made in the open ground, gives th dealer whatever advantage there is in Seed Control germinatio methods.

We do not wish to be unjust to the seedsmen, especially to thos who are honorably endeavoring to build up a trade. There is on feature of the matter, however, which must not be overlooked As stated at the outset, the American farmer of today frequentl has an uphill task to make even a livelihood. Certainly he doe not often declare large dividends. He has very scanty mean under the present conditions of deciding whether the seed h sows, and upon which his bread and butter depends, is what i should be, until the best part of a season has elapsed and it i too late to remedy the effect of sowing poor seed.

How many, who sow grass seed for their meadows and lawns know whether it corresponds to the name on the package or not Many of the varieties are unknown to the seedsman himself unles he is an expert in the business, and even experts are deceived i this matter. The more common varieties of seed themselves ar often unknown to the ordinary farmer and gardener. He buy his seed almost entirely upon the statements of the dealer, an the dealer is not always reliable.

A few days ago a sample of seed was submitted to me whic had been purchased by a New Hampshire farmer for rye gras (*Lolium perenne*). It did not contain a single seed of that specie but every seed proved to be chess (*Bromus secalinus*)! Think o selling a man seed of one of the worst weeds he has to conten with — one which is already a vile pest on many farms! Ever honorable person, be he a seedsman or planter, will join i demanding severe punishment of the perpetrator of deeds of thi kind. When once awakened to the gravity of the situation, th American farmer will hold some one responsible for such dishones

ractices. No "non-warranty" clause of a seed catalogue will nable the dealer to shirk the responsibility of selling bad seed.

One of the most stupendous frauds in the seed trade relates to ne pseudo-new varieties which are sent out with extravagant escriptions and under the most high-sounding names. Accom-anying these there may be brilliant colored pictures, perhaps nowing a sachaline plant, by whose side a man looks like a dwarf, r a melon too large to be gotten into a wheelbarrow. Generally nese "golden-wonder," "mammoth early," sorts are old and well-nown varieties sailing under false colors. The experienced ardener may not be deceived by such representations, but other eople are. Oftentimes it is largely the buyer's fault, to be sure, nce a large number of people seem to delight in being hood-inked, and will eagerly purchase seed when twenty or thirty ackages are offered for one dollar, or four for a quarter, regard-ss of the fact that they are likely to be cheated in the trans-ction.

A few weeks ago a case was before the Supreme Court, at Long sland City, N. Y., in which some celery growers sued a seedsman or six thousand dollars damages. They had purchased seed nder the name of "golden self-blanching celery," but it turned ut to be some kind of wild celery, resulting in an entire loss of ne crop. The seed had been sold under the so-called "non-arranty" provision of the seed catalogues which I have already iven, hence the Court ruled that damages could not be allowed. he trade journal reporting the case says that the result is hailed ith great rejoicing among seedsmen, as no doubt it is, for it neans, unless some just seed control laws are enacted in this ountry, that the gardener, horticulturist, and farmer will have o protection whatever against the abuses of the seed trade.

The dealer claims that he cannot be reasonably required to arrant a variety of seed true to name, since cultivated plants ften revert to their native state. If this excuse be valid, the eedsman ought to advertise such varieties as possible reversions o the original stock. He cannot throw the blame upon the rower, since it is the seedsman's business to know that the seeds e sells are genuine, pure, and germinable, and it should be he privilege of the planter to have reliable information upon he same points and in all cases. This is the object of seed ontrol.

Whether seed control methods are adopted in this count not, every buyer should have some reliable way of ascerta the value of his own seed. Purity tests will probably n difficult to make, except in the case of grasses. To identify will give even the skilled buyer some trouble. If there a scales within reach, the percentage of impurity can be estim fairly well by measuring the bulk of pure and impure s though weighing is a much more satisfactory method. In ing germination tests, an average number of large, small medium-sized seeds should be selected in lots of one or two dred for each test. In regular seed examination, two lots of hundred seeds each are usually chosen. Sometimes lots of hundred are used, the idea being that the larger the numb seeds taken, the smaller will be the chance of error. For tical purposes one hundred will do very well, especially o larger kinds, as corn, oats, melons, etc.

Since the principal factors affecting germination are moisture, and air, it is necessary to provide proper amoun each. Seventy degrees Fahrenheit, which is about the tem ture of an ordinary living-room, will do very well for most s The supply of a suitable amount of moisture is a more dif problem than that of temperature, since seeds vary greatly i amount of moisture required for germination. In general, it be said that large seeds and those with hard coats will more moisture than smaller ones, but different kinds of seed so much upon this point, that no safe rule can be given.

Perhaps the plate method is the handiest way of making germination tests which will prove at all serviceable. This sists in the use of two folds of white flannel cloth, thoro wet, between which the seeds, having been carefully counted are placed. A soup plate covered with a common dinner pla used for holding the outfit. The cloths will need to be fr moistened two or three times a week, according to the dryne the atmosphere where the plates are kept.

Other simple appliances have been recommended for testing, such as porous flower pot saucers placed in pans co ing water; plates set in similar pans and holding cloths w dip into the water so as to keep the moisture constant Probably the surest way to ascertain the germinating pow seeds is to sow them in soil in a flower pot (or, preferab

flat"), covering them very lightly with soil or fine sand, and eeping the pots closed to retain the moisture. Seeds cannot be xamined so well from time to time, however, if this method is dopted.

In making tests the seeds should be looked over every day, ıose which have sprouted being removed, and a record kept of ıe same. At the close of the test, the hard seeds remaining ıould be cut in two with a sharp knife, to ascertain whether a ve germ is within. In such cases due allowance should be made, s a certain per cent of these seeds would probably have germi- ated in a longer time.

Ten days is sufficient for testing the germination of the ereals, clovers, and most vegetable seeds, except beet and carrot, hich require at least fourteen days. The majority of grasses eed twenty-one days; timothy and rye grass, however, require ut fourteen, while the Poas need twenty-eight days. Tree eeds require from twenty-eight to forty-two days, or longer, nd special germination methods. There is usually enough air ithin the seed or immediately surrounding it, to suffice for the ıere act of germination, which is all we are concerned with at resent.

Each kind of seed is said to have a certain germinative energy, y which is meant the period required to sprout one-half or ıore of the seeds of a fresh and good sample of that species. his period varies from three to seven days in most commercial arieties, and is a matter of considerable importance, especially here a prompt decision is wished on the supposed germinative alue of a sample under consideration. For example, if a certain ot of radish seed does not show fifty per cent of germination ithin three days, it is probably old seed. Likewise, if seed egins to get mouldy after a few days' germination trial, it may e pretty safely set down as old stock, provided the test has been roperly conducted.

However, no system of private seed inspection or testing, ither by the dealer or grower, can secure the end desired; amely, accurate information as to the quality of all seed offered or sale, as well as the exclusion of wares containing seeds of eeds which would prove a serious menace to agriculture.

The seedsman may test his seed with the utmost care, as many o, but so long as he furnishes no guarantee to the buyer, such

tests are not necessarily of any value whatever to the latter. O the other hand, neither the seedsman nor the buyer would hav equally as good facilities for testing seeds as a Control or Exper ment Station devoted entirely to that purpose.

With our present system of State Agricultural Experimen Stations it seems as if seed control work in this country coul be best undertaken by some of them. The Department of Agr culture stands ready to furnish any assistance along this lin which properly comes within its province.

A few of our stations have paid some attention to the testin of seeds, particularly the North Carolina station, but no definit control has yet come from it. A course on practical seed-testin should be given in all our agricultural colleges, as there is grea need in this country among farmers and others for a good know edge of seeds, further than that which is now furnished almos exclusively by seed catalogues, — a very dubious source of infor mation in many cases.

Practical lectures along this line should be given at farmers institutes, before agricultural and horticultural societies, etc. until the farmer and gardener become alive to the importance o the subject and the need for some system of Seed Control.

I would like to see this Society take steps for the introductio of Seed Control measures within this State, perhaps asking th Legislature to appropriate an adequate sum for equipping an conducting a Seed Control Station, at the same time requirin dealers to furnish their customers with a guarantee of the germi nation and purity of all seeds sold by them.

It is not likely that such a bill would be passed without grea opposition from the petty dealers and quacks in the seed trade, fo it would be a great blow to their operations. On the other hand although the cost and trouble involved might inconvenience th honorable seedsmen more or less at first, there is no question tha in the end such seedsmen would be greatly benefited along with the farmer and gardener, and it is for the best interests of th trade as well as the vast army of seed planters in this country that we make this plea for seed control in America.

In this paper we have not had time to deal with the importance of grading seeds according to size and weight. As a usual thing no attention is paid to this matter in the seeds offered to home buyers. When clover seed, for instance, is shipped abroad, our

exporters are required not only to equal the sample furnished in purity and germination, but it must be up to a certain grade in size. Foreigners recognize the fact, which our people have scarcely begun to appreciate, that there is a great difference in the value of seed wares, even in the matter of size alone, large seed as a rule producing better plants. Seed selection, however, is a great subject by itself and merits special attention at some future time.

Here I wish to reiterate and emphasize the statement made at the outset, that in speaking today of the evils of the seed trade, no matter what impression our remarks may leave, we have no reference at all to the honorable dealer, by whom we mean the seedsman who is not guilty of any of the fraudulent practices mentioned herein. We leave to others judgment on the man who sells bad seed through ignorance or carelessness, instead of intent, recalling, however, the common principle that "ignorance is no excuse."

In conclusion we will state a few benefits of seed control, among the many which might be given :

1. Seed control would furnish reliable and non-partisan information of the real worth of commercial seeds.

2. The publicity given to the tests would act as a great incentive to dealers to furnish only good seed.

3. The honorable seedsman would be protected against the dishonorable dealer with whom he is now obliged to compete.

4. The farmer, gardener, and horticulturist could ascertain, free of cost, or for a small amount, the value of seeds purchased from dealers connected with the seed control.

5. The impositions which are now frequently practised by seedsmen upon the ignorance and credulity of their customers would be greatly diminished.

6. A universal and thorough system of seed control in America would lessen in a great measure the importation of bad weed seeds.

7. The interest awakened among farmers and others in a practical study of seeds, together with the knowledge upon the subject disseminated by the stations, although a secondary benefit, would be of immense value to American agriculture and horticulture.

Discussion.

Mr. Hicks illustrated his lecture by four charts.

(1.) Cotton seed and its germination.
(2.) Grass "seed" adulterations.
(3.) Commercial grass "seed."
(4.) Red clover seed and its principal impurities.

William C. Strong said that he had had painful experienc with seeds and could see a great difficulty in the matter guarantees; it is a hard question for seedsmen. He had h weeds come up with his seed, and feels that we ought to tak some action. He requested Mr. Hicks to tell exactly what ough to be done.

Mr. Hicks replied that after briefly stating the necessity to th Legislature, an appropriation ought to be asked for (probably n more than three or four thousand dollars would be needed for th purpose) to start a Seed Control Station. Such a station could b managed either in connection with this Society or some other goo horticultural or agricultural society, or by the State Agricultur Experiment Station. Experiment Stations do not receive mone enough to carry on this line of work to any extent, but they us ally have experienced men, greenhouses, etc., which would mak them the best places for the location of seed-testing station The sale of seeds containing dodder, Russian thistle, and simil pests, should be prohibited by law. A general law that no co mon seed should contain more than five per cent of impuri should be established. As the germinative capacity of seeds ca not be determined by mere inspection, dealers should be require to have their seeds tested and should state the percentage whi will vegetate, a certain amount being allowed for variation tests, and should fix their prices accordingly.

Robert Farquhar wished a lecture like this could be deliver before every farmers' institute in the country. Some farme he said, do not appreciate the cost of producing good seed. very interesting lecture could be given on the methods used b good dealers in testing. The impression may have gone abro that no seedsman could be sued, but such is not the case. farmer bought two pounds of Purple-top Flat turnip, and said produced Ruta-baga turnips. Mr. Farquhar proved that his see had never been sown, but Ruta-baga had. The duty of eve

seedsman is to sell seed of the best quality. If seedsmen knew that their seeds would be tested and advertised it would tend towards purity.

Hon. James J. H. Gregory spoke of the risks and cares of the seed business, and the wrong impression often drawn by the planters, who frequently accuse the seed-grower unjustly for failure caused by their own mistakes. First-class seedsmen have to, and do, both as a matter of conscience and business wisdom, destroy a great quantity of seed on account of low vitality; seeds are not like grain, and are never graded; if they were, they might be sold at lower prices. Onion seed some years is as high as ninety-five per cent in germination; other years seed of the same varieties, though quite new, is very poor in germinating quality. Old seeds will sometimes push out a root, and go no further. Tests under cover are not like tests outside. We want to encourage public sentiment for good seed. The many risks incidental to the business all show the advantage of seedsmen growing the seed they sell. We cannot believe that seedsmen, as a rule, sell worthless seed.

Varnum Frost thought a great deal depended on the persons sowing the seeds. The nature of the seeds must be known, and the conditions should be favorable for seed to germinate. Seeds of Cucurbitaceous plants, such as the melon, squash, and cucumber, require different soil temperatures and degrees of moisture from those needed by dandelions, lettuce, peas, celery, and beets; the latter class do better in lower temperatures with more moisture. Weather conditions contribute more to the germination of seed than anything else. In conclusion, after fifty years' experience he said he would not dare to sell seed which he had grown himself under the best conditions, to persons who do not understand the requirements of each kind of seed, if he had to guarantee them. Under no circumstances could a man do business on this plan.

Mr. Hicks made a point that a great deal depends on the methods of sowing. Testing, however, should not be left entirely to the farmer or to the seedsman. Trained and efficient persons connected with a station thoroughly equipped for the purpose, should conduct impartial tests in the laboratory, in the greenhouse, and outdoors. Some kinds of seed will not germinate well in cloth. June grass comes up best in the soil.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 15, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

ON SOME SCALE INSECTS.

By L. O. HOWARD, Chief of the Division of Entomology, United States Department of Agriculture, Washington, D.C.

All over the country orchardists are now greatly interested in the subject of scale insects. This revival of interest in these creatures among growers of deciduous fruit trees in the East is largely the result of the establishment in this part of the country of the San José scale. Other species, however, have become prominent of late, and general treatment for scale insects is gradually becoming one of the elements of successful apple, pear, and peach growing. One of the principal and most fortunate results of this appearance of the San José scale in the East — if such a disaster can be called fortunate from any point of view — is the direction of the attention of all persons interested in, or in any way connected with, fruit and shade or ornamental trees, towards the great evils which are liable to be brought about through the distribution of diseased stock by nurserymen, and towards the whole subject of legislation against injurious insects. It is my purpose in this paper to lay before you some of the facts concerning the most important of the scale insects which are to be found, or are liable soon to occur, upon your fruit and shade trees; to discuss to some extent the matter of remedies; and to dwell more particularly upon the two great questions referred to.

The State of Massachusetts is rather fortunately situated with regard to injurious insects, and the methods of cultivation generally adopted are advanced in their character. Clean cultivation is the rule, and horticulturists are an exceptionally intelligent class of people. Holdings in general are small, and the State is far enough north to escape many of the most important insect pests. Even Massachusetts trees, however, suffer from the attacks of a number of injurious species, and there are still others which are as yet to be found here in small numbers only, whose increase is to be guarded against; and others, again, which are

liable to be introduced into the State upon nursery stock, and which will certainly flourish here if once introduced.

In speaking of the State of Massachusetts as a whole it must be remembered that the same conditions do not prevail over the entire State. You have a double watershed from an elevated north and south ridge, passing through the vicinity of Worcester, sloping gradually towards the eastern seacoast in one direction and towards the valley of the Connecticut river in the other. West of the Connecticut river there is a more abrupt rise to the Berkshire hills, and thence a descent of almost equal abruptness to the valley of the Hudson river in New York. It results from this conformation that more southern forms are found in a comparatively narrow strip up the valley of the Connecticut river and to a lesser extent up the seacoast, than in other and more elevated portions of the State; and experience has shown that certain insects will establish themselves in these strips which will not continue to reproduce and multiply when accidentally introduced into other Massachusetts localities. This principle, which is now fairly well established, has especial significance in considering the question of the possible future damage in Massachusetts by two of the most important scale insects injurious to fruit trees; I refer to the San José scale and the so-called West Indian peach scale. So far as our experience goes (and this experience may be said to be based upon more than negative evidence) neither of these species will prove itself especially injurious in regions which belong to the transition life zone, which includes all of Massachusetts except the strip mentioned. It is even likely that both species will die out if introduced at any point in this life zone.

The San José scale, as you know, was brought from California on the Kelsey plum, to two large nurseries in New Jersey — those of Parry Bros., at Parryville, and J. T. Lovett, at Little Silver — in 1886 or 1887. The trees were undoubtedly thoroughly infested when received; did not thrive; and in both cases most of them were ultimately taken up and destroyed. The stock, however, had been multiplied by nursery methods, and from the original stock and that subsequently obtained, the scale spread more or less completely through both nurseries in question. Now, from that year until 1893, both these nurseries (and as you know, both, during that period, did an enormous business) sent

out nursery stock north, south, east, and west, and a certain proportion of this stock carried upon it the San José scale. The scale was not recognized until the summer of 1893, when I found it upon some pears from Charlottesville, Va. Since that time my investigations have resulted in the ascertaining of nearly two hundred points in which the scale has established itself and become destructive. Not one of these points is in territory which clearly belongs to the transition life zone, and yet who can question the statement that thousands and thousands of young trees bearing this scale must have been sold to fruit growers located within this region, and have been planted by them.

Even considering the San José scale by itself, the evidence is entitled to great consideration, and to my mind is sufficiently strong to form a basis for a guarded prediction. But it must be further remembered that this is but a single instance among very many known to us, and that it is upon the mass of facts we are basing our knowledge of the indications of the general laws which govern the geographical distribution of species.

There are, however, localities in your State where the San José scale and the West Indian peach scale are liable to do great damage, and it thus becomes necessary for fruit growers to inform themselves about both species. I have now in proof a complete bulletin referring to the whole subject of the San José scale, which it will give me pleasure to send to any members of this Society who care to apply for it, so that it will not be necessary here to treat of this insect at any great length.

The life history of all scale insects may be briefly summarized very much as follows:

The eggs are laid by the adult female either immediately beneath her own body or at its posterior extremity. Certain species do not lay eggs, but give birth to living young, as do the plant lice. This abnormal habit is not characteristic of any particular group of forms, but is found with individual species in one or more genera. The young, on hatching from the eggs, are active, six-legged, mite-like creatures, which crawl rapidly away from the body of the mother, wander out upon the new and tender growth of the tree, and there settle, pushing their beaks through the outer tissue of the leaf or twig and feeding upon the sap. Even in this early stage the male insect can be distinguished from the female by certain differences in structure. As

a general thing, the female casts its skin from three to five times before reaching the adult condition, and beginning to lay eggs or give birth to young. With each successive molt the insect increases in size and becomes usually more convex in form. Its legs and antennæ become proportionately reduced, and its eyes become smaller and are finally lost. As a general thing it is incapable of moving itself after the second molt, from the spot where it has fixed itself, although certain species crawl throughout life. The adult female insect, then, is a motionless, degraded, wingless, and, for all practical purposes, legless and eyeless creature. In the armored scales she is absolutely legless and eyeless. The mouth parts, through which she derives nourishment, remain functional, and have enlarged from molt to molt. Her body becomes swollen with eggs or young, and as soon as these are laid or born she dies.

The life of the male differs radically from that of the female. Up to the second molt the life history is practically parallel in both sexes, but after this period the male larva transforms to a pupa, in which the organs of the perfectly developed, fledged insect become apparent. This change may be undergone within a cocoon or under a male scale. The adult male, which emerges from the pupa at about the time when the female becomes full grown, is an active and rather highly organized creature, with two broad, functional wings and long vibrating antennæ. The legs are also long and stout. The hind wings are absent, and are replaced by rather long tubercles, to the end of each of which is articulated a strong bristle, hooked at the tip, the tip fitting into a pocket on the hind border of the wings. The eyes of the male insect are very large and strongly faceted. The mouth parts are entirely absent, their place being taken by supplementary eye spots. The function of the male insect is simply to fertilize the female, and it then dies. The number of generations annually, among bark lice, differs so widely with different forms that no general statement can be made.

As a general rule scale insects have been divided, both from the classificatory standpoint and from the standpoint of practical remedial treatment, into those which are armored or secrete scales over their bodies, and those which are naked and have no differentiated scale. From the practical standpoint, however, this division is of no great use, since even the so-called naked

scale insects become so hard-bodied, and their integument is com posed of such solid chitine, that they are practically as resistan to the action of washes as are those species which have a dens scale of wax. A better classification, when we are considerin the matter of remedies, is to divide the group into those specie which give birth to living young and those which lay eggs. Th object of this division will be at once apparent. Those scal insects which give birth to living young, drop a number of young per day for a comparatively long period. Those first hatched become resistant to the action of washes within a few days, so that at no one time do we have even a majority of the insects in the young and unprotected condition in which washes, weak enough to do no damage to the foliage, will kill them. With the scale insects which lay eggs, on the contrary, there is a more or less definite hatching period. In other words, all the eggs in a given generation hatch at approximately the same time, and the majority of the young are in a condition to be killed by weak washes at about the same time. The species that give birth to living young can therefore be treated to advantage only in the winter, when there will be no danger of injuring the foliage of the trees by the action of washes which are strong enough to kill the insects under their scales. The best example of this class is the San José scale. The egg-laying species, as exemplified by the common oyster-shell barklouse of the apple, pass the winter (most of them) in the egg condition under the old mother scales. They hatch, approximately all together, the latter part of May or in June, and at this critical time may be destroyed by the dilute kerosene emulsion.

Let us hurriedly, then, take up a number of species, all of which Massachusetts fruit growers should know. But a few words need be said about each, since the illustrations on the screen and the specimens which I shall exhibit afterwards, will convey a more definite idea of the appearance of the insects than any words of description.

The lecturer next gave a brief account of the following species, of some of which engravings from the publications of the Department of Agriculture are here presented :

The San José scale (*Aspidiotus perniciosus*), Fig. 1.

Oyster shell barklouse of the apple (*Mytilaspis pomorum*), Fig. 2.

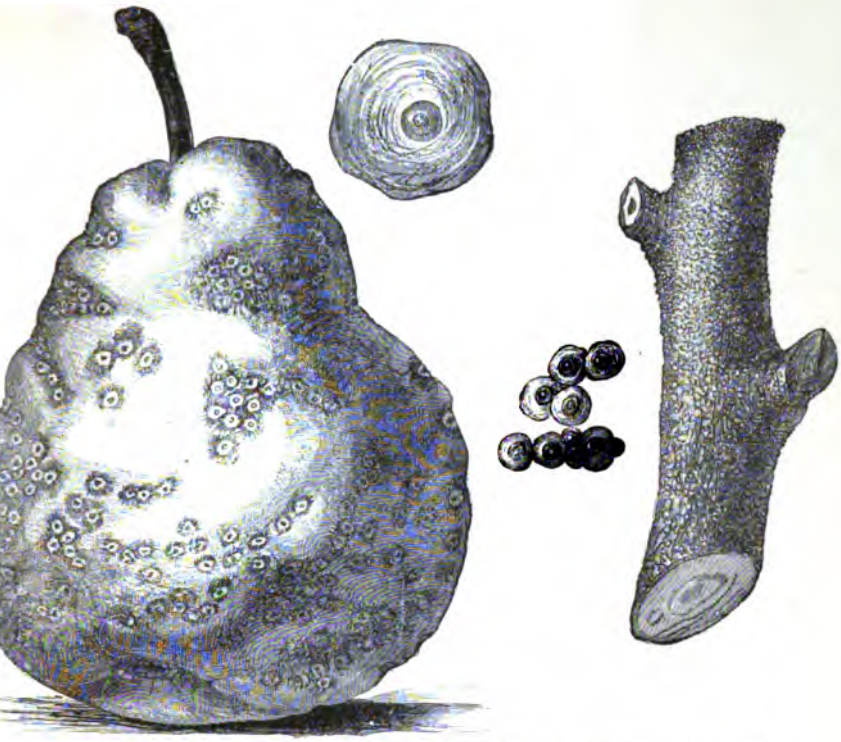

FIG. 1. — *Aspidiotus perniciosus* (The San José or Pernicious Scale), on pear fruit and twig, with enlarged male and female scales. (*From U.S. Dept. Agric.*)

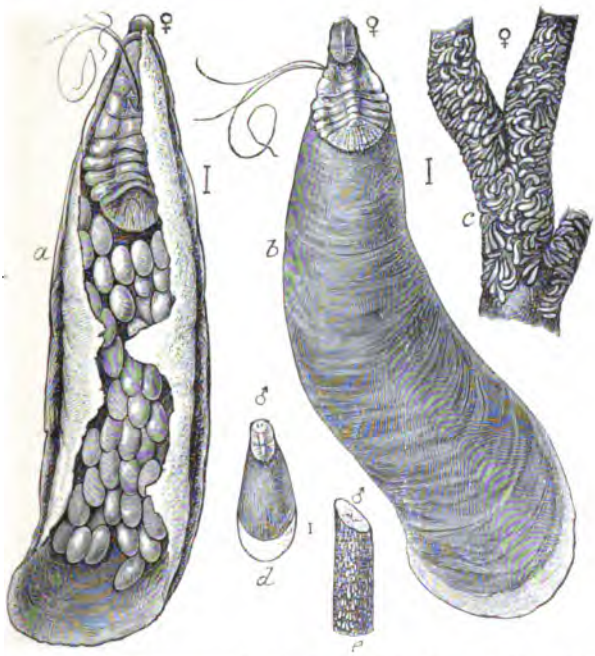

FIG. 2. — *Mytilaspis pomorum* (The Oyster-shell Bark Louse): *a*, female scale from below, showing eggs; *b*, same from above — greatly enlarged; *c*, female scales. (*From U.S. Dept. Agric.*)

FIG. 3. — *Chionaspis furfurus* (The Scurfy Bark Louse) : *a*, *c*, females ; *b*, *d*, males — *a*, *b*, natural size ; *c*, *d*, enlarged. (*From U.S. Dept. Agric.*)

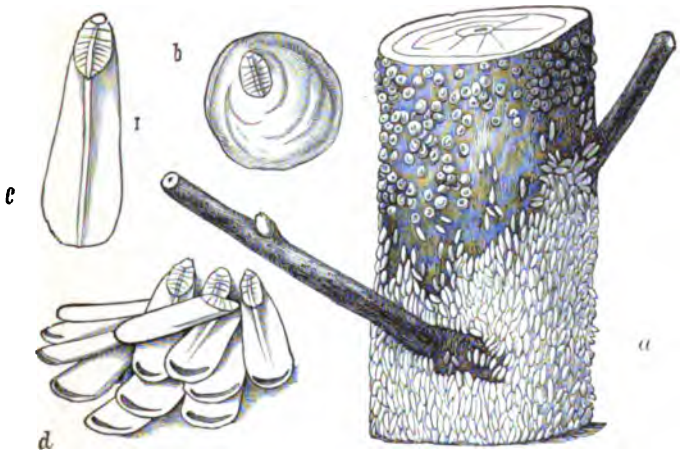

FIG. 4. — *Diaspis lanatus* (The New Peach Scale) : *a*, branch covered with male and female scales — natural size ; *b*, female scale ; *c*, male scale ; *d*, group of male scales — enlarged. (*From U.S. Dept. Agric.*)

FIG. 5. — *Diaspis rosæ* (The Rose Scale): 1, natural size on twigs; 1*a*, female scale — enlarged; 1*b*, male scale — enlarged. (*From U.S. Dept. Agric.*)

FIG. 6. — *Chionaspis euonymi* (The Euonymus Scale): Scale natural size on leaf and twig; *a*, male scale — enlarged; *b*, female scale — enlarged. (*From U.S. Dept. Agric.*)

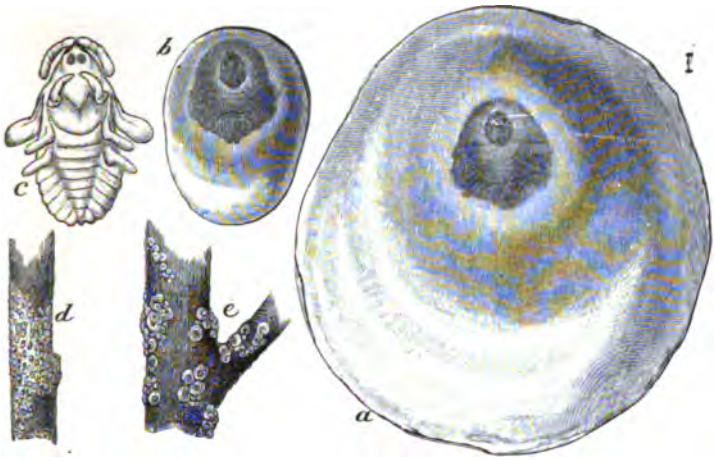

FIG. 7. — *Aspidiotus Juglans-regiæ* (The English Walnut Scale): *a*, female scale; *b*, male scale; *c*, male chrysalis; *d*, male scales on twig; *e*, female scales on twig — *a*, *b*, *c*, enlarged; *d*, *e*, natural size. (*From U.S. Dept. Agric.*)

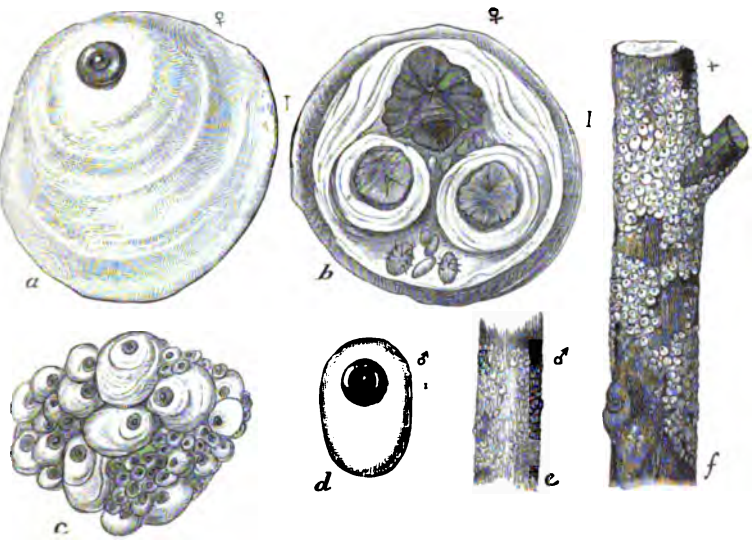

FIG. 8. — *Aspidiotus camelliæ* (The Greedy Scale): *a*, female scale from above; *b*, same from below; *c*, mass of scales as appearing on bark; *d*, male scale; *e*, male scales on twig; *f*, female scales on twig — *e* and *f* natural size; *c*, considerably enlarged; *a*, *b*, *d*, greatly enlarged. (*From U.S. Dept. Agric.*)

Scurfy barklouse (*Chionaspis furfurus*), Fig. 3.
West Indian peach scale (*Diaspis lanatus*), Fig. 4.
Rose and blackberry scale (*Diaspis rosæ*), Fig. 5.
Euonymus scale (*Chionaspis euonymi*), Fig. 6.
Beech and Linden scale (*Prosopophora sp.*).
Willow scale (*Chionaspis salicis*).
Imported oak barklouse (*Asterodiaspis quercicola*).
Cottony maple barklouse (*Pulvinaria innumerabilis*).
Maple leaf scale insect (*Pseudococcus aceris*).
English walnut scale (*Aspidiotus juglans-regiæ*), Fig. 7.
Rapacious scale (*Aspidiotus camelliæ*), Fig. 8.
Common plum Lecanium (*Lecanium prunastri*).

Remedies for Scale Insects. — Experimental work with remedies for scale insects was begun by the Department of Agriculture in 1880, at a time when Professor Comstock made his extensive investigation of the insects of this group. The recommendations which he made at that time practically focussed upon whale-oil soap. In California he found that this substance, applied at the rate of three-quarters of a pound to the gallon of water and at a temperature of one hundred degrees Fahrenheit, killed every individual of the red scale upon orange. Two years later the remarkable work of Mr. H. G. Hubbard upon the scale insects of the orange in Florida resulted in the systematizing of the work with kerosene emulsions, and demonstrated that no better mixtures can be applied to unprotected scale insects than a solution of the standard kerosene soap emulsion in ten parts of water. Mr. Hubbard's results were widely published, and his mixture remained from that time until two years ago the generally accepted and almost solely used remedy against scale insects. No satisfactory experiments with winter washes were made in the East until the winter of 1893–94. California workers had, in the meantime, however, developed a line of washes based in the main on lime, salt, and sulphur, or lime, sulphur, and blue vitriol, or resin, caustic soda, and fish oil. In the winter of 1893–94 extensive experiments were begun at the Department of Agriculture in Washington, and these California washes were naturally tested at the start. It was found, somewhat to our surprise, that although the evidence in favor of their efficacy on the Pacific slope was not to be doubted, in the East they were practically of no use. By no means all of the scales were killed, and in some

instances such an absurdly low proportion of the insects di
that this line of experimentation was soon abandoned. T
reason for this extraordinary difference in the efficacy of the
washes may be laid partly to differences in the average win
temperature between the two sections, and partly to the gr
difference in precipitation in the early part of the winter.

Following these early experiments, many other substances,
many combinations, were tested, and, not to worry you wi
details, the practical outcome has been that for dormant tr
affected by practically any scale insect, the best wash beyond
doubt was shown to be whale-oil soap in considerable streng
Some species are more susceptible to the action of the wash th
are others. Even against the extremely hardy San José sca
one and three-quarters of a pound of the soap to the gallon
water, put on thoroughly, has proved absolutely effective. It
advised that the applications be made in the autumn after t
leaves fall, and again in the spring before the buds burst. Litt
or no harm will be done if the application be made at even
later date, since in April peach trees in full bloom have be
treated with no serious consequences. Experiments on a lar
scale seem to show that the fall application has occasionally
injurious effect in limiting the amount of bloom the followi
spring, but the increased vigor of the plant probably more th
offsets the falling of the bloom.

The greatest difficulty with the soap washes, and one whi
must be obviated before uniform results can be hoped for, is
the varying strength and character of the soap used. No t
brands of soap on the market are alike, and the differing resu
which are obtained by experimenters are undoubtedly due
large measure to the character of the soap itself, in connecti
of course, with the varying climatic conditions. In addition
securing a good strong caustic soap, one is wanted which, at t
strength employed on cooling, will not become a semi-solid
glutinous stringy mass, as do most of the ordinary soaps a
also many of the fish-oil soaps of more recent manufactu
The old whale- or fish-oil soap employed in the original expe
ments could be sprayed in solution at three pounds to the gall
and this is a most necessary characteristic. It is highly desi
ble, therefore, that soap makers should be encouraged to und
take the manufacture of a definite brand of soap which can

relied upon to be uniform in composition and strength, and, if possible, to have some authoritative supervision to insure such results.

We have, then, two mixtures upon which we can rely. First, the standard kerosene emulsion, diluted with ten parts of water, for application to the trees while in full foliage in summer and autumn. Second, whale-oil soap at one and three-fourths pounds to the gallon of water, applied in the late fall and early spring to the dormant scales.

Natural Enemies of Scale Insects. — The extraordinary results which followed the introduction of the Australian lady-bird (or ladybug as it is more frequently called) into the orange groves of California at a time when their complete destruction was threatened by the white or cottony cushion scale, have attracted an enormous amount of attention to this method of fighting scale insects. As has been repeatedly pointed out in the publications of the Department of Agriculture, this instance was exceptional, and, in fact, practically unique. We had an imported insect to deal with; we had ascertained its original home; we knew that in its original home it was not abundant or destructive, and that therefore it was being kept in check by some specific enemy, since other species of scale insects abounded there and were injurious to vegetation. With no other imported scale insect at the present day do we have these grounds to work from. Nevertheless, this fact is ignored, and persons whose orchards are suffering and who are disinclined to go to the trouble and expense of spraying, are continually agitating the question of parasites and natural enemies. The first Australian ladybird, the Vedalia, as it is called, is being constantly asked for for all sorts of scale insects, and its careless distribution has, in one instance at least, resulted not in a benefit to the section into which it was introduced, but in a great detriment, since, with the predatory insect itself was sent a supply of the fluted scale as food, and when the specimens were liberated the Vedalias died and the scale insect established itself in new territory. A great deal has been said about the merits of the later importations of predaceous insects from Australia to California. Mr. Koebele, the original discoverer of the Vedalia, during an extended trip to New Zealand and Australia, sent to California a number of species of Coccinellids, which were found by him to

feed upon several species of destructive scales. That some these later importations have multiplied and done good work restricted localities, there seems little doubt, judging from t emphatic statements of members of the California State Boa of Horticulture and their agents and employees. Statemer from others as to the inefficacy of the importations are almo equally emphatic, and it is difficult for a person in the East gain a clear idea as to the present condition of affairs.

The greatest danger in undertaking to use parasites and p daceous insects experimentally on a large scale is that time a money are lost in a dreary waiting for results which may nev be achieved. I would, nevertheless, not be understood as co demning careful experiments in this direction, and I am glad notice that the State Board of Agriculture of New Jersey h endeavored to get an appropriation of a thousand dollars throu the Legislature this winter for the purpose of sending Profess Smith, of Rutgers College, to California to collect natural en mies of the San José scale, and introduce them into New Jerse New Jersey is now the worst sufferer from this insect, and the absence of a State law compelling insecticide work, and wi many fruit growers disinclined to undertake any such wor conditions are very satisfactory for an experiment of this kir In the beginning of the winter I had made arrangements for similar introduction of these insects, as well as of a suppos fungus disease which kills the San José scale, into infest orchards in Maryland, and there is a possibility that results importance may be gained. We have already in the East ma insects which feed upon bark lice, and many species of parasit which destroy them. There is no practical way, however, bringing about any increase in the numbers of any of the species, and their work is, from a practical standpoint, not wor consideration.

The Nursery Question. — The wide distribution of the S José scale in the years following 1887, by Parry Brothers, J. T. Lovett and his successors, the J. T. Lovett Company; the Franklin Davis Company, Keene & Foulke, F. Boulon, P sons & Sons, the Shady Hill Nurseries, J. A. Ramsburg, and t Cherokee Nurseries, has served to draw especial attention to t fact that for many years nurseries have been distributing ba lice and other destructive insects far and wide. In the gre

majority of cases this distribution has been made unwittingly. In the case of the San José scale there can be no question of the fact that none of the nurserymen engaged in its spread had the slightest idea that they were sending out such an orchard scourge. Further, it must be said that as soon as the matter was brought to their attention, almost without exception they made every effort to stamp the insect out in their nurseries, and to stop its future distribution. The Parry Brothers, for example, destroyed thousands of young plants, and applied the best available remedies to all their remaining trees. It is certain that as a result of this occurrence, nurserymen in future will examine their stock more closely, and will be far more careful than they have been in the past, so that, after all, the introduction of this insect into the East has not been an unmixed evil. Just as there are careless, in fact criminally careless, persons in all walks of life, so there must be careless nurserymen, and under present conditions fruit growers will not be able to rely upon the absolutely clean condition of any stock which they buy. It has been suggested that every person purchasing nursery stock should demand a guarantee from the seller, — a guarantee which states definitely that the stock has at no time been infested with injurious insects, and that it is in vigorous healthy condition; and which further agrees, that in case the stock should be found to be infested with scale insects within a certain time from the date of purchase, it shall be replaced with sound stock without cost to the purchaser. Most nurserymen would be ready to furnish such a certificate, but nevertheless this will hardly cover the case. The mere replacing of the stock is a comparatively small matter, but the purchaser will have no redress for the damage done by the introduction of such insects as the San José scale and its spread to his older trees. It is here, as in other aspects of the question, that we must look for legislative aid. The responsibility of the nurseryman should be fixed by law. His responsibility should extend not only to his own stock, but to all stock which he handles in fulfilling his contracts or those of his agents.

That the vast majority of the nurserymen of this country are alive to their own interests in this matter, and that they have either, directly or indirectly, the interests of the fruit-growing population at heart, is thoroughly shown by a resolution passed at the Indianapolis meeting of the American Association of

Nurserymen last summer. Professor Webster, of Ohio, handled the whole question without gloves; he had show the part taken by nurserymen in the distribution of the San scale in the clearest light; he had commended the frank, w hearted and straightforward course of the Parry Brothers, had condemned in the most caustic manner the shiftless, evs not to say dishonest, actions of certain other firms. On conclusion of this paper, Colonel Watrous, of Des Moines, I rose instantly and said, "I think that a paper that comes and deals with our interests as fairly and as wisely and in gently as this one, deserves a vote of thanks; and I move t vote of thanks of this association be tendered Professor We for his paper, and that we approve his course." The m was seconded and carried unanimously, and the further di sion showed that the members of the American Associati Nurserymen are heartily desirous of working for the best inte of the fruit growers, and are willing to work hand in hand the official economic entomologists.

Legislation. — The subject of insect legislation has brought more strongly than ever to the attention of the ag turist and horticulturist in the East by this outbreak of the José scale, and in New York, New Jersey, and Virginia have been taken in the direction of legislation against specific insect. More than a year ago, in anticipation of a pected demand for information on the subject of legisl against injurious insects in general, I compiled a bul which brought together all the recent laws in the several S of the Union against injurious insects. The demand for bulletin has been so great from agricultural and horticul societies interesting themselves in this matter, that the edition has already become exhausted.

The most progressive State in this direction is California. fruit-growing interests are so great and her climate natural favorable to the multiplication of injurious insects of kinds that she naturally takes the lead in this direction. experience of fifteen years in this work has enabled her l cultural societies to bring about a gradual improvement o laws and regulations, until the State is at present in exce condition to control, so far as may be, any outbreak of inju insects, and in fact to prevent such outbreaks. Briefly sum

ized, the State laws provide that whenever a petition is presented to the Board of Supervisors of any county signed by twenty-five persons possessing orchards, calling attention to any orchards which are affected with injurious insects, the Board shall within twenty days select three commissioners for the county, to be known as the County Board of Horticultural Commissioners. These commissioners serve three years, and it is their duty, whenever they deem it necessary, to cause an inspection to be made of any orchards, nurseries, fruit-packing houses, or salesrooms, and if they are found infested with injurious insects to notify the owner or person in charge, of the condition of affairs, and require them to eradicate and destroy the pest. If the owner refuses or neglects to abate the nuisance, the commissioners do the work themselves, the expense becoming a county charge, the sums so placed being a lien on the property from which the nuisance has been removed. The commissioners further have power to divide the county into districts and appoint local inspectors.

At the same time the State Board of Horticulture is empowered to make certain regulations covering the State work, and covering the introduction of new injurious insects into the State. Some of these regulations which bear upon quarantine provide for the inspection of all trees, plants, buds, and scions brought into the State. The quarantine officer of the Board must be notified within twenty-four hours of the arrival of such packages, which must be disinfected according to the methods laid down by the Board, upon arrival at any point where they are to be unloaded. If any of them are found to be infested with insects or fungous diseases, they must remain in quarantine fourteen days, or until the quarantine guardian can certify that they are free. Railroads are required to notify the State Board of Horticulture of the arrival of trees or plants from outside the State, postal cards backed with the blank forms being furnished by the Board for this purpose. The United States Customs officers and the Southern Pacific Railway, in particular, render the Board of Horticulture most valuable assistance. It may be interesting to quote in full the instructions of the Southern Pacific Railway Company to its agents. They are as follows:

"Agents are hereby forbidden to deliver any trees, plants, cuttings, grafts, buds, scions, seeds, or pits received from any point

outside the county in which their station is located, until s shipment has been inspected by the official duly appointed the district in which said station is located. If no county h cultural quarantine has been authorized by the Board of Co Supervisors, inspection is not required, unless the shipment inated outside of the State of California, in which case prop must be held until inspected by the State Board of Horticult

"All agents must keep themselves fully advised of all hortic ural ordinances passed, names, districts, and addresses of spectors appointed by the county in which the station is loca and will coöperate with and follow all instructions of such spectors, that, by joint effort of the company and the vari horticultural Boards, the best interests of the State may served."

Fruit growers in California thus have the matter of ins pests practically in their own hands, and the work of any cou will be practically controlled by twenty-five enlightened f growers. The early adoption of any such stringent legisla in Eastern States is doubtful, but there is a growing necessit every State for a well-framed law which may be put into op tion at the outset of any threatened outbreak of an introdu or native species. Absolute safety by means of quarantin hardly to be accomplished even in California, and in a stat well protected by its geographical situation as Massachuse there is by no means the same need for a rigid quarantine. general law, however, ready to be put into operation might h saved Massachusetts many thousands of dollars in the case of Gypsy Moth. Such a law in New York would enable effici work against that almost equally destructive European ins now flourishing in the vicinity of New York City, the Leop Moth; while such a law in New Jersey would enable the ex mination at the present day of the recently imported pear-t borer — an insect which, if it spreads, will render the grow of pears all through the country a much more difficult expensive matter than it is at present. The objection to s legislation has always been the fear of possible abuse of opp tunities; but the danger in this direction, it seems to me, is worth considering compared with the danger possible, and e probable, to our horticultural interests in the absence of pro laws.

Discussion.

Mr. Howard illustrated his lecture with stereopticon slides and with specimens of all of the insects considered.

Professor Benjamin M. Watson asked, How can scale insects on small trees best be killed?

Mr. Howard replied that in California fumigation with hydrocyanic gas, under an oiled tent, is most extensively practised. In the East this treatment has not been so successful. Here we must rely mainly upon spraying.

J. W. Manning stated that in good orchards in California the insects are properly treated, but in other places they are as abundant as they are in neglected orchards in the East. He himself had seen orchards in which the Vedalia was not abundant enough to keep down the fluted scale.

William C. Strong moved a vote of thanks to Mr. Howard for his able and comprehensive lecture, which was unanimously passed.

Nathaniel T. Kidder inquired what kind of weather is most desirable for applying remedies.

Mr. Howard replied that it was all important to apply them in dry weather. Some of our best washes, notably the whale-oil soaps, act slowly and do not reach their full effect for several weeks. If there is one season of the year which more than another is apt to be dry for an extended period, that season should be chosen for the application of these washes. The long dry spell in the early winter in California is one reason for the superior action there of the lime, salt, and sulphur wash and the resin wash.

Hon. William R. Sessions inquired about the method of spread of the San José scale.

Mr. Howard stated that its natural spread was extremely slow, the young crawling but a short distance, while at forty-eight hours of age they cannot move. The spread, then, is largely accidental. The active young cling to the feet of birds and to flying insects and are thus carried from tree to tree and from orchard to orchard. The largest spread is accomplished by the commercial transportation of the insect on nursery stock and fruit. A young tree which has been badly infested for two or three years is likely to die. Very badly infested trees should be dug up and burned.

Mr. Strong thought that we need not apprehend a very
increase in scales under conditions of clean culture, such
vail rather generally in Massachusetts.

Mr. Howard said that this remark of Mr. Strong's was u
edly true as regards the old and well-known scales, such
oyster-shell bark-louse and the scurfy bark-louse, but with
of the newer species, such as the San José scale and th
Indian peach scale, clean culture will by no means suf

Mr. Manning said that the *Gossyparia ulmi* or elm sc
become very common in portions of Massachusetts, and
had seen it at Madison, N.J. He had worked assiduousl
stroy it, but found it a difficult insect to fight. He had de
many young and thinks that his trees are now free from t

MEETING FOR LECTURE AND DISCUSSIO

SATURDAY, February 29,

A meeting for Lecture and Discussion was holden t
eleven o'clock, the President, FRANCIS H. APPLETON, in th

The following lecture was delivered on the John Lewis
Foundation :

SOME TENDENCIES AND PROBLEMS IN THE EVOLUTION OF S AMONG PARASITIC FUNGI.

By Professor GEORGE F. ATKINSON, Cornell University, Ithaca, N.Y.

Notwithstanding the great amount of information wh
already possess concerning the development and life hist
parasitic fungi, the labor of each year adds more and mor
stock of our knowledge on the subject. There is evidentl
more still to be learned before we shall be in the possessio
the facts concerning these fungi which it would be desir
know from even a practical standpoint. The accumulati
dence of the number of species, the variation in form, th
ence of environment, and their peculiar habit or adapt
suggest that these plants are also affected by the operation
laws of descent and differentiation, just as other organism

While we can do little more than speculate on the sul
the present time, speculation is often very fruitful in the ou

because of the suggestions accompanying it which are often turned to good account. It does not seem out of place, therefore, at this time to point out what seem to me to be some of the tendencies in the evolution of species among parasitic fungi, and at the same time to call attention to some of the more practical problems which may be profitably considered.

Tendency toward a Wide Range in Parasitism. — One of the very striking tendencies which we see in the case of some of the parasitic fungi is that of a wide range in parasitism, so that the fungus is not confined to certain genera as hosts, nor even to the families in which these genera are located, but the range of their operations and injuries extends beyond these limits. In a sense they are omnivorous, and such species sometimes receive their specific name in recognition of the great versatility of their tastes and depredations, and their easy adaptation to a great variety of things in their gourmand-like search for dainty bits of pabulum.

The common fruit rot is a good example of the fungus appetite which rarely goes begging for some satisfying morsel. It appears to be king of rots in the case of certain of our stone fruits, like the peach, plum, and cherry. But it also attacks the pomaceous fruits, berries, etc., and finds the twigs of the peach, cherry, and other fruits palatable. As with many other parasitic fungi, its growth and the injuries which it causes are alike hastened by the prevalence of wet or moist weather. It is also much more likely to attack overripe fruit, and the fruit grower who takes the precaution to pick his fruit for shipment while it is still firm, or he who selects the hard-fleshed varieties, often checkmates this enemy. The fact that it is more likely to attack the overripe fruit or the soft-fleshed varieties, indicates that it is not strictly an obligate parasite, and that, even when it is doing much of its injury, it perhaps could not be said to be existing as a parasite, since the fruit is then in a very suitable condition to act as an excellent culture medium. It does, however, act as a serious parasite at times, and since it can adapt itself so readily to a saprophytic or parasitic existence, the question might be raised whether or not it is just now in the transitional stage, passing from a saprophytic life to a parasitic one. If this were the case we should expect that as time went on it would become more and more dependent on the host in a living condition, and that

ultimately it would pass entirely from the domain of saprop
ism to the domain of parasitism.

Unfortunately we are in the dark as to the true state of thi
since we have not the recorded monilia genealogy for more t
a few years back. It might, perhaps, be asked with equal
priety, Is not the monilia passing from the parasitic habit to
saprophytic? Here we are also in the dark, but it would seem t
what little evidence we have would tend to show that this latter
gestion could not be true of the monilia, since we should exp
to find that a fungus which had been an obligate parasite o
very wide range of hosts for a long period would have develo
numerous species as the hosts themselves became more and m
unlike by the action of the law of evolution and variation am
themselves.

If we look upon it as a saprophyte which is making its way i
the domain of parasitism, its present habit of growing read
and abundantly during a large part of the season as a saproph
would tend to prevent its lapse into distinct forms. It would
incorrect, however, not to admit that even in saprophytism
Monilia fructigena could exist under conditions which would te
to separate it into distinct species in the lapse of time.

The fungus of potato and tomato rot also possesses quite
wide range in the hosts which give it sustenance. It occurs
only on many of the Solanaceæ, but also on certain members
another family, the Scrophulariaceæ. So far as we know it
much more of an obligate parasite than the monilia, and acco
ing to the experiments of a late renowned investigator of t
fungi, Anton de Bary, it cannot live as a saprophyte, for wh
the tissues of the plant have decayed the mycelium of the fu
gus speedily dies in those parts. Brefeld says, on the contra
that it grows readily as a weed on various dead substances, b
in his works there does not seem to be any evidence to this effe
other than the mere statement. Since the eminent de Bary ca
to opposite conclusions, it would appear more convincing if t
experiments leading to these results which Brefeld reached we
given in detail.

One year ago I made quite an extended experiment, hoping
be able to grow the *Phytophthora infestans* in pure culture
artificial media, or upon sterilized potato and also on steriliz
tomato leaves, which, in the living condition, form the best know

food for the fungus. While I was able to obtain the fungus in pure culture, and kept it growing in the laboratory in this condition for more than eight months, it absolutely and invariably refused to grow when an attempt was made to grow it upon dead, though sterilized, potato and tomato leaves. The growth of the fungus was obtained in the well-known way by cutting open affected potatoes during the month of January, and placing them in a moist chamber with the cut surface uppermost in a warm room until the mycelium in the tubers started to new life and appeared on the surface with the characteristic conidiophores and conidia. Rectangular blocks were then cut from fresh potatoes, rinsed in a one-tenth per cent corrosive sublimate solution, and dropped one each into a culture tube containing water previously sterilized by heat in sufficient quantity to permit of the washing off the corrosive sublimate from the upper end of the block, and to provide sufficient moisture at the bottom of the culture tube. To these blocks of potato, portions of the mycelium and conidia of the Phytophthora were transplanted, and in several of them a pure growth of the fungus was obtained, which was verified by examination with the microscope and found to agree in all respects with the fungus grown on the potato. When these blocks were well covered with the fungus, transfers were made to fresh tomato leaves sterilized by heat, as well as to potato blocks sterilized in the same way. But in all cases the fungus refused to grow on these heat-sterilized substances, though it continued to grow readily when transferred to fresh living blocks of potato.

If the fungus cannot grow as a saprophyte, then it is quite an interesting case of wide range in parasitism, with no apparent tendency to develop fixed forms on the different hosts.

Another member of this genus might be mentioned here, with which you are probably not so familiar, though it has been reported in this country, the seedling rot Phytophthora, *P. cactorum*. This has been known in Europe since 1870, and occurs on quite a wide range of hosts. Because of this de Bary gave it later the name *P. omnivora*, the specific name indicating, as you see, that the fungus is not very choice in the selection of its food. It was first described as producing a rot of species of Cactus, but it is chiefly known as the seedling Phytophthora, since it produces at times a serious rot of seedling trees, especially of the beech. The forms described on somewhat widely

separated hosts would seem to indicate that there was a tende here to the development of forms which are characteristic different hosts, though these are not sufficiently distinct n phologically for mycologists now to consider them diffe species. A vivid imagination might suggest that in times perhaps the potato fungus was not so very different from *Phytophthora cactorum*, or, to speak more nearly to the po that the two were merged in one as a quite widely vari species, but that they now have become quite well separated. this were the case it might explain the total absence, so as we know, of the sexual stage in the *Phytophthora infest* *i.e.*, the conidial stage might have become so different on certai the hosts, structurally as to produce a different and charact tic form, and biologically as to hinder it from developing sexual stage. We must not forget, however, that the absenc the sexual stage might be given a different interpretation, also that it may even now occur on some hosts which we h not yet examined, or under conditions which we have not discovered.

The white rust, *Cystopus candidus*, which attacks many of species of the Cruciferæ, might also be mentioned as an insta of wide range in parasitism within a single family. The w known *Puccinia graminis* has a very wide range on the gra and grains, as compared with many other species of the U dineæ found on the Gramineæ. Other species might be n tioned, but this number serves well to show how omnivo some species are in their tendencies as compared with m others.

Tendency toward a Narrow Range in Parasitism. There is, on the other hand, a tendency with some species t restricted range in parasitism, so that so far as we know a si species is confined to but few host species, or even to but host species. This is well illustrated by the common *Fusiclad dendriticum* and *F. pirinum*. The former, the apple scab, is of the most common of the fungus diseases of the apple t especially during wet seasons, affecting the leaves and fruit, causing dark spots by the growth of the threads and spores the surface. The *Fusicladium pirinum*, the pear scab, atta the pear tree in a similar way, and so nearly alike are the fungi that there has been some question among certain myc

gists whether the two fungi are rightly separated into two species. Cultural experiments will probably settle this question, and there is some evidence of this kind which goes to show that the two are distinct species. This is partly supported by the discovery of what is supposed to be the perfect stages of these fungi, since the form in which we knew them on the apple and pear is what is called the "imperfect," or conidial stage.

Brefeld cultivated a species of *Venturia*, which he called *V. ditricha piri*, and from the ascospores he succeeded in developing a conidial form which bore such a strong resemblance to the *Fusicladium pirinum*, that he considered the *Venturia* to be the perfect or ascosporous stage of the pear scab. Aderhold, in 1894, found another species of *Venturia*, *V. chlorospora mali*, on apple leaves, from which he grew a conidial form very nearly like the *Fusicladium dendriticum* (the apple scab). Then he recounts also how he was able, starting from the fungus of apple scab taken from the leaves of the apple, to grow the conidial stage in artificial media and also to develop the venturia stage, which would be pretty good evidence that the venturia is the perfect stage of the apple scab. We should also expect to find that a venturia is the perfect stage of the pear scab, and this perfect form Aderhold hoped to find in the *Venturia ditricha piri* of Brefeld. But in searching on pear leaves for this species of *Venturia* he found both *Venturia ditricha piri* of the pear, and also *Venturia chlorospora mali* of the apple, and this has prolonged the investigation. But if the apple and pear scab should be found to be one and the same species — and I do not anticipate that this will be the case — still the parasitism would be quite restricted in range as compared with the species above enumerated. It is quite in accordance with the theories of descent that at least in the remote past a single species of Fusicladium combined the characters of the now two species, or at least possessed the inherent tendencies which have resulted in the evolution of these two forms.

Many of the species of the genus *Sclerotinia* exhibit well the tendency to a narrow range in the parasitic habit, as the *Sclerotinia vaccinii* Wor., on *Vaccinium Vitis-Idæa*; *Sclerotinia Oxycocci* Wor., on *Vaccinium Oxycoccus*; *Sclerotinia baccarum* Schroeter, on *Vaccinium myrtillus*; *Sclerotinia megalospora* on *Vaccinium uliginosum*; and others. On the other hand, one

species has quite a wide range, the *Sclerotinia libertinia* F'k which we know in this country as frequently producing diseas of forcing-house plants, causing decay of the stems, and th developing small black bodies of fungus tissue called sclerotia.

Tendency toward the Exclusion of Forms from t Life Cycle. — Another peculiarity in the tendency of certa fungi is that of the exclusion, or shutting out of forms, or stag from its life history. A good illustration of one of these fun is seen in a sterile fungus which I have frequently found to the cause of damping off of seedling plants, it being often a mo common agent in the production of this disease than the *Pythiu debaryanum*, which has often been spoken of as the sole cause this trouble. I speak of it as a sterile fungus because in m experience with it during several years from several differe states, I have never been able to find or to produce in artifici cultures any recognized fruiting form. According to peculia ties of its development it would be classed by some under t form genus *Rhizomorpha*, when it develops slender rope-lil strands by the parallel interlacing of its threads, or under t form genus *Sclerotium*, when it develops these characterist bodies.

It is enabled to propagate itself by the breaking up of sho moniliform threads on the surface of the sclerotium, the sep rated segments of two or more cells functioning as conidi while the sclerotia act as resting bodies to tide the fungus ov unfavorable periods for its growth. We cannot say that it h no other form in nature, and probably some form of true fruc fication is developed at some time, though this is not necessar As compared with many other forms which quite regular develop their characteristic fructification, there is a very decid tendency here to the loss of that form if that has not alrea taken place. The plant at one time undoubtedly had a fruiti form. It may by this time have lost it, or it may have becon so changed that in this vegetative condition it practically repr sents, either biologically or structurally, an entirely differe species from its immediate ancestor, and thus has no compl mental fruiting form into which it could pass in order to comple its development.

Some rhizomorphs, it is true, have been found to be vegetati states of some member of the mushroom family, the so-calle

ozonium, for example, or the rhizomorphs which are connected with the *Agaricus melleus.*

There is no doubt a tendency in a vast number of species to eliminate, or to become permanently separated from, some one-time complemental form. Many of these are represented in the so-called "imperfect fungi," and one or more of our common species of *Botrytis* at least exhibit a tendency in this direction, if they have not already become permanently divorced from the complemental peziza form. One of these, *Botrytis vulgaris*, is especially abundant in forcing houses, attacking nearly all kinds of plants, and growing indifferently as a saprophyte or as a parasite, though perhaps more frequently as the former. It is well known by its conspicuous fuzzy growth on the surface of the affected parts of the plants as it matures its conidia. The mycelium, which is profusely branched and septate, grows in the tissues of the attacked plants, penetrating the cell walls and causing a soft rot of the tissue. From this mycelium the erect conidiophores, or fruiting threads, arise through the epidermis, and at a little distance from the surface produce quite a number of short divergent branches, which bear near the ends oval conidia in such a crowded condition that they appear to form small heads. At first this fuzzy growth is colorless, but with age it becomes grayish-white or grayish-brown in color. Besides the peculiar grappling organs which it develops, and which are said to excrete a ferment that dissolves the cellulose of the host plant at the point of attack, and thus to aid the fungus in gaining an entrance to the tissues, there are developed in artificial cultures, on suitable media, numerous black sclerotia composed of compactly interwoven fungus threads.

I have on repeated occasions seen these develop, especially on sterilized bean stems, or other sterilized plant tissue, in great numbers. Several times an attempt has been made to grow a perfect form from the sclerotia, but always with negative results up to the present time. The sclerotia probably need a period of rest, and this period has been given for several months on different occasions, and when the sclerotia were planted on moist sand they invariably developed the well-known conidiophores of the botrytis form which appear on the diseased plants. Perhaps the period of rest for the sclerotia has not been sufficiently prolonged. I have sclerotia now which are more than one year old,

and the action of these ought to throw some light upon th doubtful history of the fungus. Some have confidently asserte its connection with the *Sclerotinia libertiana*, which also occu in forcing houses, and we should expect that if it does develo an ascosporous form it would be of the sclerotinia type. B that the connection has been properly established there seem room for doubt, since the sclerotia or the mycelium of the *Sc rotinia libertiana* do not develop the conidiophores, nor have th conidia of this ascosporous form been observed except on th evidence of the doubtful connection of the *Botrytis vulgaris*.

This would seem to show that the botrytis was at least nearl if not quite, separated from the sclerotinia form. From prese conceptions of the descent of the group of the Ascomycet we must accept the view that the botrytis at one time ha such a form, or that it is descended from some other botryt form possessing a sclerotinia stage, by differentiation in th conidial form only. This it seems to me is a perfectly natur process in the evolution of forms which are restricted for lon periods to only one of their phases of development, and it a pears probable that it has prevailed to a very great extent in th Hyphomycetes and Sphæropsideæ.

Several of the form genera which produce the diseases o plants known as leaf-blight and leaf-spot, like *Cercospora*, *Sep toria*, *Phyllosticta*, *Phoma*, etc., probably contain numbers o species which do not have any complemental perfect or asco porous form. It is true that in several cases the perfect for has been pretty certainly determined. We might cite as illu trations, the black rot of the grape (*Carlia bidwellii*), straw berry leaf-blight (*Sphærella fragariæ*), leaf-spot of the quince an pear (*Entomosporium maculatum*), cotton leaf-blight (*Cercospor gossypina*), etc.

The perfect stage of the black rot fungus has been rarel found, and then on dead parts of the grape, as the dead berrie which lie on the ground during the winter. The phyllostict form, which attacks the living leaf, stem, and fruit, and become a true parasitic form, is very wide spread and common. Quit likely it does not need the perfect form as a means for its pe petuation, since the leaf-spot usually begins earlier in the spri than the development of the ascosporous form, the pycnospor being able to live through the winter, probably in protecte

places, as in the crevices of the bark of the vine or in similar crevices on the trellis.

The same is the case with the strawberry leaf-blight, the ramularia stage being the form which produces the disease, while the perfect form, the sphærella, is developed in the dead spots of the leaf, probably late in the season, or during the winter or in the spring. Even here it is not necessary for the continuation of the fungus in the ramularia form, for there are stromata or rudimentary sclerotia developed from the mycelium on the diseased spots, which live through the winter and are able the following spring to develop a crop of the conidia while the sclerotium is lying on the ground. Thus the disease is started anew for the season without the intervention of the sphærella form, and this probably happens in a great majority of cases, since the sphærella stage is rarely collected.

So with the leaf-spot of the pear and quince. The parasitism is brought about by the imperfect form, the entomosporium, which causes small brown spots on the leaves, of a nearly circular outline, with darker minute elevated pustules containing the conidia. These become ruptured in an irregular manner and set free the insect-like conidia. On the fruit it causes irregular blackish spots which check the growth of the fruit tissue at these places and may cause it to crack. The perfect form of the fungus, which Sorauer calls stigmatea, develops on the fallen leaves during the winter and the following spring. But it is not necessary as a means for bridging the fungus over the winter period, even though the ascospores mature early enough in the spring for an infection of the leaves from that source, since the entomosporium spores also live through the winter on the fallen leaves, or are developed in the pustules which have hibernated, and the infection can take place from them as well.

The leaf-blight of cotton has a similar history, the parasitism arising from the imperfect form, or rather the conidial form, being the one which appears on the living leaves, while the sphærella form develops on the dead fallen leaves. Whether the cercospora form of the cotton leaf-blight can live through the winter has not been determined, but it is likely that it can.

Besides a few instances in which the perfect forms are known, there are a very great number of the imperfect forms which have not been connected with a perfect form. It is true that the

number of fungi which we know in the perfect form is ver large, even in some of the genera which have been shown to h the perfect stage of some of these imperfect fungi, and also th some of these are even to be connected with others of the impe fect fungi if we could only be fortunate enough to trace out the life history. But many of them are found under condition which would probably preclude their being connected with an but a few of the known species of the imperfect fungi, unles the phenomenon of heterœcism (growing on different host during different stages) has a very much wider application i nature than there has as yet been any hint of from authenti sources. One well-authenticated case of heterœcism outside o the Uredineæ is found in the species of *Sclerotinia*, known as *S ledi* Nawaschin, which has been found by Woronin and Nawas chin to have its conidial form on *Vaccinium uliginosum*, while th sclerotinia form is developed on *Ledum palustre*.

In many of these imperfect forms there is a sort of physiologi cal dimorphism existing between the parasitic imperfect form, as we have seen, which grows on the living parts of the host, and the perfect form, which we have seen grows on the dead parts of the same host. It appears as a parasite in one case and as a saprophyte in the other. This property of growing as a sapro phyte suggests that in some cases the perfect form may grow and produce its fruit on other material than that of the same host on which the imperfect form may develop, since in artificial cultures many of these fungi will grow well on several different sub stances, which in one sense would be a sort of heterœcism. In other cases it is equally probable that the perfect form, even as a saprophyte, does not depart widely from the path of its host in its development.

One very interesting and important peculiarity lies in the fact that in many of the fungi belonging to the great group which we now have under consideration, each of the complemental forms may develop and multiply quite independently of each other. We have seen how by the intervention of stromatic bodies or sclerotia, or even by the conidia themselves, imperfect forms may live through the winter or during other unfavorable periods for their development and may start the disease and the course of their development entirely independently of the perfect form; or the mycelium may live in the adjacent tissues of the diseased

woody stem, the fungus being in fact perennial in the imperfect form.

A number of the perfect fungi reproduce the ascosporous form during numbers of successive generations without the intervention of a conidial or pycnidial form. In the case of the imperfect forms which are parasitic while the perfect forms are saprophytic, while I have not in mind now any species[1] in which the ascosporous form reproduces itself successively as a saphrophyte without the intervention of the imperfect form, I do not doubt that there are a number of instances of such behavior.

This peculiarity of the imperfect forms developing from year to year quite independently of the perfect form has probably led to a differentiation of the conidial stages of many fungi to an extent which has carried some forms quite beyond the possibility of their ever passing into the perfect form again. By this I mean it is quite possible that following the tendency to vary and produce forms which are regarded as different species, combined with the habit of reproducing their own form from year to year, such physiological as well as structural peculiarities may be evolved as to so change them that they could not develop an ascosporous form without an abrupt reversion or the sudden evolution of a new species of the perfect form.

During this process of differentiation of the imperfect form into a great number of species, the ascosporous form would probably for a time serve as the bond connecting all the forms through which they would now and then pass. But from the quite independent life and development of the imperfect forms some of them would probably become so far changed that the bond would no longer serve to show that they were all of one stock, and we should have species of the imperfect fungi evolved, which become entities in themselves. In such cases we could not hypothetically say that there existed some other stage in which the fungus passed the winter, or some perfect stage which carried it over unfavorable periods, and that the discovery of this perfect form was indispensable to the complete understanding of the relation of the fungus to the particular disease in question and to its etiology.

Such is probably the case in many of the parasitic species belonging to the form genera *Glœosporium*, and *Colletotrichum*,

[1] Certain species of Teichospora and Ceratertoma do in artificial media.

which cause the diseases known as anthracnoses. While th
are probably groups of species included in these form gene
which if they have a perfect form would be found to belong
only to different genera of ascomycetes, but even to differ
families of fungi, there seem to be species so closely allied t
together with the fact that they can in one way or another p
the winter or unfavorable periods for growth, they suggest a l
origin from the same perithecial form. The colletotrichum
the bean can live in diseased seed beans and start the dise
anew when the seedlings begin to grow. The cotton colletotrich
lives on the seed, either by the vitality of the conidia or fr
stromatic bodies, so that the disease can be originated at
beginning of the season by simply planting seed which co
from diseased bolls. In the case of the glœosporium of
privet, *G. cingulatum*, the mycelium is perennial in the diseas
stems, and breaks out on the advent of spring again. In ma
of the species stromatic bodies are developed which would ass
them in hibernating.

Artificial cultures of certain of the polymorphic fungi belo
ing to the Pyrenomycetes show that at least under these con
tions imperfect forms are usually slow to develop a complement
ascosporous form, though this is by no means general, wh
the ascosporous form can usually quite readily be grown into t
conidial form. Some cultures which I carried on with *Nect*
cinnabarina, a very common fungus found on a great variety
twigs and dead limbs, and by some supposed to be quite a serio
parasite at times, illustrate this. The culture was started fr
the ascospores of the fungus found on dead stems of sambuc
(elder). Sown in nutrient agaragar the ascospores germinate
but grew slowly, forming small colonies by the side of large o
of different saprophytic fungi which appeared in the culture.
transplanting some of the colonies to sterilized bean stems
culture tubes, the characteristic stroma and conidia of the tub
cularia stage appeared, but after keeping the cultures for near
a year and making several transfers, no ascosporous fo
appeared. I would not infer from this that the perfect fo
could not be produced from the imperfect form in artificial cu
ures, for I believe that it could if advantage were taken of t
right conditions. But it is a difficulty which has been encounter
by others, and in the case of other species, and shows probab
in nature also, so far as we can judge from observation, that t

ascosporous form of polymorphic fungi passes more readily into the imperfect form, than the imperfect form passes into the perfect form in many cases.

Tendency toward the Inclusion of Forms in the Life History. — As opposed to the shutting out of forms in the evolution of species there is a tendency among some to the inclusion of forms. This is an accompaniment of the increasing polymorphism of certain fungi, or in the increase of forms in a given species of fungus. By the increase in the number of forms in which a fungus can grow and multiply, it increases its power in the struggle for existence. Some of these additional forms in certain species are probably either developed as a result of the tendency of the same species to cut off an earlier form so that this new form may take its place in tiding it over unfavorable periods for its growth, or in making more certain the perpetuation of the fungus in the imperfect condition. The incipient stromata of many species, as well as the sclerotoid bodies, segments of the mycelium which acquire a thicker wall and a change in the condition of the contents so that the protoplasm is more resistant, gemmæ, and many bodies of these and similar kinds, which in many species take on more or less the form, and certainly the function, of conidia, may be enumerated as coming under this head. A very interesting case is that of the *Monilia fructigena,* which causes the rot of many fruits. Under certain conditions there is developed in this species an aspergillus-like form of fruiting.

Tendency to a Fluctuation in Virulence. — The tendency to a fluctuation in virulence in certain species is a point which would repay careful investigation. This tendency is probably better known in the case of many bacteria than in the fungi. Races of bacteria can quite easily be developed under artificial conditions which are more or less permanent, according to the length of time that they are subjected to the special treatment or conditions. These races may show peculiarities of form, physiological peculiarities, or peculiarities in virility as parasitic germs, and partly upon the attenuation of the virility of certain species does the theory of preventive inoculation rest.

The common botrytis, which has been mentioned above, is an illustration of this tendency in certain species of fungi. Under some conditions it exists in our forcing houses on the dead or

decaying parts of plants, and for a long period produces serious harm, but again it gains such a foothold at times on certain plants, that nothing short of the destruction of the host will stop its course. For several years I have been interested watching the habits of this fungus, and many times have been constrained to look upon it as a harmless accompaniment of other disorders; and usually, I think, this is the case. But the present winter some potted roses came under my observation showing first a few leaves which had been damped off by the fungus. Gradually the mycelium invaded the more permanent tissues of the rose stems until all parts of the plants were so thoroughly infested with the parasite, and so badly disorganized in place that it is doubtful whether they could ever recover. De Bary has shown how the mycelium of the *Sclerotinia libertiana*, after it has been aroused to activity by growth on the dead parts, is enabled successfully to attack the living ones.

This tendency is of course in many cases largely governed by environment and the physiological condition of the host, but the fungus makes use of these conditions, and for the time is enabled by them to set such a pace of parasitism, that plants are more easily invaded which would otherwise escape injury.

Adaptation to New Conditions. — Close to this tendency to fluctuation in virulence is the tendency toward adaptation to new conditions. This can be easily demonstrated in the case of some species when attempting to grow them in artificial media. For several years I have been attempting at various times to obtain a culture of the leaf-spot of the quince and pear. Several times the fungus has been found to germinate in nutrient agar, but in no case would it develop more than a few short threads in this medium. The spores, after having been transferred to sterilized pear fruit in culture tubes or to sterilized bean stems, showed no signs of growth until after about three weeks, when a minute tuft of mycelium could be observed at the point where the spores had been transplanted. In the course of two or three weeks more numerous spores characteristic of this fungus were present, and the mycelium was quite well developed. In making new transplantings from these spores to fresh sterilized bean stems, a new crop of spores and well-developed stromata were present in a little more than two weeks, and on transplanting the spores from this second crop to fresh culture tubes of the same

medium, the third crop of spores was developed in a little more than one week. Now the fungus grows abundantly and quickly as a saprophyte in artificial cultures.

The nitrifying organism (a bacterium) studied by Frankland presented similar peculiarities in the attempts to grow it in artificial culture media, and there was also a change of form in the adaptation to new culture media.

Other cases might be cited of like adaptations, and they lend some support to the statements that certain fungus parasites of one region when carried to another sometimes acquire a rapidity of development and adaptation to the new conditions on new varieties of hosts, which makes them more virulent than in their native land and condition. It also suggests that certain species of fungi may pass slowly from feral plants to cultivated ones, and when they become adapted to the new conditions may, from the numbers of the host, and perhaps the lack of certain hindrances which existed in the feral state, as well as the more artificial physique of the host, become serious pests.

Fluctuation in Seasonal or Polymorphic Forms. — There is also a fluctuation in seasonal forms, if they may be so called. De Bary notes that *Peronospora alsinearum*, one of the downy mildews, in the neighborhood of Strasburg, in the spring develops conidia which are accompanied or immediately followed by the oöspores on the same host, while in the autumn only the conidia are developed. A fluctuation of this kind, or in the appearance or omission for a greater or lesser period of certain phases of many of the polymorphic species, may account for the varying notions as to what phases or stages appertain to certain species of fungi. Yet it would not do to admit, without careful investigation, the inclusion of forms which have been seen to accompany well-determined stages in the life history. Perhaps it is not yet definitely established just what forms belong to the black knot fungus of the cherry and plum.

Periodicity in Development. — Among other tendencies we may inquire whether there is not a tendency in some species or groups of fungi to a periodicity in the development — a periodicity I mean which would require two or more years in the completion of its round. I do not mean a periodicity which requires several years for the development of the vegetative phase of the parasite before the fruiting occurs, but a periodicity similar to

what occurs in the case of the bearing of some fruit trees, wh
a tree which has been permitted to bear very heavily one sea
will usually bear but little fruit the next year, and so a sor
alternation sets in, fruiting years being followed by years
scanty fruit. It has seemed to me at times that the fluctua
which sometimes marks the appearance one year of fung
great numbers, and then a scanty appearance the next y
might find an explanation in a sort of periodicity. Climatic
ditions undoubtedly play a most important part in the per
icity of many of the great fungus attacks, especially of th
fungi which are dependent on a new infection of the host f
year to year for their propagation. The perennial species
leaf curl and plum pocket sometimes are very abundant
season, and then the next season are comparatively rare. T
years ago the specimens were very plentiful, and the follow
year I made preparations for a harvest of the species in an ea
stage of development, but it was almost impossible to obtain
material. It seems strange that climatic conditions should
solely responsible for the great abundance one year and
scanty appearance the following year. Can it be that the my
lium one year largely spends itself in the production of the fr
ing form so that there is comparatively little mycelium left
the buds of the tree or young tissue, and that the following y
the energy of the fungus is largely devoted to the replenish
or building up again of a stock of the vegetative portion,
that with the opening of the buds the next succeeding year it
advance to the fruiting condition rapidly and abundantly?

Variation in Form. — In many fungi there is a tendency
a great variation in form and habit in what is recognized a
single species. This tendency to variation in form in the case
certain species makes it exceedingly difficult in some other ca
to determine just the limits of the species. Certain species
the Uredineæ, as *Puccinia heterospora*, and *P. pruni-spino*
vary either in the number of cells in the spore or in the marki
of the spore. In the form genus *Cercospora* there is very gr
variation in the length of the conidia, even in a single species,
that there is some uncertainty at times as to whether this va
tion is due only to meteorological conditions or to a spec
difference in the fungus in question. Again, in the group
fungi known as the powdery mildews, there is the spec

Podosphæra oxyacanthæ, quite common on certain cherries and other species of the genus *Prunus*, which has been considered by some to represent several different species, according to the number and position of the appendages of the perithecium. In the genus *Microsphæra* there exists one of the great mycological puzzles as to just what the species *Microsphæra alni* is, so variable and so intergrading are many of the forms which have been considered distinct species by some. Some of these variations in form are concomitant with the occurrence of the fungus on certain host species, and the host species in some cases has served as the only criterion for the separation of forms. Some go so far as to include in this *M. alni* all forms of variation within certain limits on all hosts except the oaks, drawing the line at the genus *Quercus*, while it is impossible from purely morphological characters to separate most of the forms on the oaks from this generalized concept of *Microsphæra alni*.

Tendency toward Fixity of Form. — On the other hand there is a tendency toward a fixity of form and habit in some fungi. Many of the members of the family known as the Smuts, the Ustilagineæ, are, partly from the simplicity of their spores, limited to very slight variation of form. This is well shown in the case of the oat, wheat, barley, and other smuts. Judged simply from morphological characters the variation in form would not seem sufficient to warrant the separation into so many species as are now accepted. Cultures, however, which have brought out differences in the course of development as well as in the confinement to distinct hosts have shown that species are to be maintained where forms were formerly alone accepted. It is quite within reason that at one time several of the species now considered separate were one species, with variations including nearly or quite the limits of the differences exhibited by the species at present, and that now certain of these characteristics have become fixed along with the confinement of the form on a single host.

Physiological or Biological Forms. — Perhaps one of the most interesting tendencies is that in the direction of the evolution of biological or physiological forms of a given species. These are forms which could not be detected from a purely morphological standpoint, but are determined by the study of the relationship of the species to its various hosts.

Some recent experiments in the culture of the Uredineæ Eriksson, Klebahn, and others, show that some species of ru which are indistinguishable in form and which have quite a w range in parasitism, have become separated into biological for the forms being confined to a narrow range of hosts in the num of those ascribed to the species as a whole. For example, *Puccinia graminis*, the common wheat rust, which occurs on grains and many of the grasses, there are several form spec which are shown to be quite certainly fixed, while there others which are not so certainly fixed.

In *Puccinia graminis* three forms have been determined wh are considered fixed; one form, *secalis*, on what might be cal the rye group, since it occurs on *Secale cereale* (rye) and also *Hordeum pratense*, *Triticum repens*, and *Elymus arenarius* second form, *avenæ* on the oat group, *Avena sativa*, *A. elat Milium effusum*, *Alopecurus pratensis*, and *Dactylis glomera* and a third form, *airæ* on a single species of grass, *Aira cæs tosa*. Two other forms which are considered fixed have not be certainly determined. They both occur on certain species grasses. Still another form occurs on wheat which is not c sidered fixed.

These forms were determined by cross inoculations with ure spores upon the different hosts, so that uredospores from a member of the rye group would not infect any member of t oat, aira, agrostis, or poa group, but would infect any mem of the rye group. Likewise, uredospores from any member the oat group would not infect any member of the other grou but would infect any member of the oat group. The wh form was found not to be fixed, since infection in a few instan took place with uredospores from both the rye and oat gro This fact is looked upon as indicating that the form on wheat the original one from which all the others have been evolv and that it retains even at the present time some of its origi plasticity.

Another interesting result of these investigations is the f that the puccinia spores from any of the groups can be used produce the æcidium, or cluster cup stage, on the barberry, the æcidiospores from the barberry which were developed fr the rye group would not work on the oat group, while th would work on any member of the rye group; similarly æcid

spores from the barberry which were developed from the oat group would not work on the rye group, while they would work on any member of the oat group.

Similar form species were found in the case of several other Uredineæ which were investigated, and it would not be surprising if similar specialized forms of species were to be found throughout the entire range of the more strictly obligate parasitic fungi.

Problems. — These are some of the tendencies which I believe are manifested in a greater or lesser degree in the evolution of species among parasitic fungi. It must be admitted that in many instances we have indulged largely in speculation, but there is, I think, reasonable ground for speculative discussion upon these tendencies. We might regard them as to some extent hypothetical, and thus they would serve to indicate some of the lines on which investigation might profitably be carried further on, for the solution of these questions would throw a great deal of light on the treatment which should be given or recommended for the prevention of the fungous diseases of many of our cultivated plants.

A number of the problems connected with the subject are suggested in the discussion of the various paragraphs, and the solution of these questions requires not only the investigations of the mycologist, but also of the practical fruit grower. Prophylactic treatment, no doubt, must be depended on in a great many cases; but in many others by careful attention to the breeding of healthy, stocky, and resistant varieties of fruits and other plants, to this extent we shall be able to dispense with the knapsack sprayer.

The number of varieties noted for productiveness and for fruiting at opportune seasons is one of the wonderful achievements of the horticulturist and florist. While hardiness is also a characteristic of some of the new productions, it would seem that less attention had been given to this very important quality in planthood than to other points. One of the important problems is the development and fixing of disease-resistant varieties, as well as the general well-being of plant life, and the setting of a wholesome environment to counteract the tendencies among plant enemies which the absence of these qualifications in plant culture is promoting.

One of the encouraging signs of progress in the war u fungous enemies of plants is the enlightened action by wh many horticulturists, as individuals and as organizations, profiting from the results of scientific investigation. Not o is this so with regard to direct prophylactic treatment, but pecially in the general tendency toward improvement in meth of propagation, culture, handling, and environment, which applied to the management of the fruits that minister so larg to the comfort and happiness of life. These are the coast fences and the methods of diplomacy by means of which thr ened invasion is averted, and by means of which the life of plants and the sources of revenue are preserved.

Discussion.

Before the lecture commenced printed slips were distribu which contained a brief abstract of the paper.

President Appleton complimented the lecturer on the inter and value of his paper, and asked whether any attempts had b made to destroy insects injurious to vegetation by means parasitical fungi.

Professor Atkinson replied in the affirmative, first saying t the families of such fungi were different from those wh attacked plants, and citing the case of the attempt in the West kill chinch-bugs by means of *Sporotrichum globuliferum*.

Professor A. B. Seymour asked whether the cluster-cups, p duced upon the barberry by the specialized forms of *Pucci graminis*, differed from each other and from those produced the type, intimating that they might be true species.

Professor Atkinson answered that more investigation w needed before those matters could be determined.

President Appleton inquired in regard to the possibility cultivating the parasitical fungi which attack insects.

Professor Atkinson replied that these matters are now tracting the attention of investigators. It is claimed that t cultivations of *Sporotrichum globuliferum* which have been s to the farmers have done great good; but these questions are no means settled.

BUSINESS MEETING.

SATURDAY, March 7, 1896.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The Secretary being absent by reason of illness, the President appointed Miss Charlotte M. Endicott Secretary *pro tem.*

On motion of Joseph H. Woodford it was voted that on account of its length the report of John G. Barker, as Chairman of the Committee on Gardens, be referred to the Committee on Lectures and Publication without reading.

The following named persons, having been recommended by the Executive Committee, were on ballot duly elected members of the Society:

ROBERT CAMERON, of Cambridge.
VIRGIL C. GILMAN, of Nashua, N.H.
THOMAS HARRISON, of Melrose Highlands.
WILLIAM F. DREER, of Philadelphia, Pa.
J. W. HOFFMAN, Ph.D., of Tuskegee, Ala.
Miss AGNES W. LINCOLN, of Medford.

Adjourned to Saturday, April 4.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 14, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

ORNAMENTAL PLANTING FOR PARKS AND PUBLIC GROUNDS.

By WILLIAM S. EGERTON, Superintendent of Parks, Albany, N.Y.

In response to an invitation extended by the Massachusetts Horticultural Society to read a paper on "Ornamental Planting for Parks and Public Grounds," I have prepared the following brief summary of the "Theory and practice of ornamental planting, as applied to suburban parks and city gardens or greens." It

is impossible to cover so broad a field in a brief paper; my
has been simply to outline the scheme of work; to suggest
lines upon which natural, pleasing effects can be secured, with
entering into an elaboration of detail and technicalities that w
expand this paper to unwonted limits, and possibly confuse
hearers.

A number of standard authorities have been drawn upo
facilitate the preparation of this paper, but the subject matte
largely the reflection of an extended experience in landscape
dening and the maintenance of public parks.

The use in America of the word "park" as a general desig
tion for gardens, green courts, and all sorts of public place
an exaggeration of a French application of the word to the m
private or kept grounds of a chateau connected with a forest.

Open spaces for public use in a city may be termed "place
grounds in turf and trees within places, "place parks;"
broad thoroughfares planted with trees and designed with spe
reference to recreation as well as for common street tra
"parkways." A park, as defined by Mr. Frederick Law O
sted, "Is a place for the enjoyment of rural scenery in a se
that a garden, for instance, is not. A town park is a place
escape to such scenery, from scenery of a town-like or artifi
character. The circumstance that distinguishes a park, the
fore, is that of seclusion. All parks, properly so called,
surrounded by screening plantations, and it is a leading mot
in their design to shut out of view, to those to be benefited
them, whatever might be unfavorable to a continuous impress
of consistent sylvan scenery." In a word, to shut off from th
within the park a view of such features of a town-like charac
as absolutely define the limits of a park and take away
deceptive and pleasing effect of its uncertain area.

The fundamental elements of any large park are not its roa
walks, bridges, buildings, and other accessory features requis
for the public accommodation in the use of the grounds. Th
may rather be classed as necessary evils. The essential elem
is the landscape, its surface undulations of hill and dale,
lawn; its trees, shrubs, single or in mass, in grove or copse;
deep woods or open glades, and its broad stretches of greensw
or water. All of these elements in their endless combinati
are constantly modified by the varying conditions of the point

view, the atmosphere, and the seasons. The true ideal of park recreation, to persons worn by the harassing turmoil of city life, is the refreshing enjoyment of all that may be seen and felt amid the placid manifestations of nature embodied in the landscape.

There is nothing really different in the general theory of landscape gardening as applied to the ornamentation of parks from that theory as applied to ordinary grounds. The apparent difference lies in the special application to some particular individual undertaking.

In actual practice one park must be treated differently from other parks, this difference of treatment being dictated by the situation, surroundings, and topography. No general plan can be outlined that would suit the demands of every locality. The general idea and keynote, however, to most successful examples of park construction in this country (and there are no better examples abroad) is the simple and natural effects, or meadow-like stretches of lawn, circumscribed or bounded by ornamental plantations properly distributed and massed. The main repose and highest enjoyment of parks reside chiefly in these spots.

The sense of quiet repose ministered to by a large lawn surface is not satisfied by picturesque ground, however vigorously it may be planted, and as the need for quiet repose in this workaday world is more constant than the need for vigorous stimulus, a lack of pastoral, meadow-like stretches of lawn in a large public park will always be felt by the habitual visitor to be a serious disadvantage.

As a general rule each element in the scenery should be simple, natural, and unobtrusive, so that the passing observer is impressed with the manner in which views are successively opened before him, through the innumerable combinations in which the individually modest elements constantly rearrange themselves — views which often possess every quality of complete and impressive landscape compositions.

The aim should be to produce the park, rather than the more elaborate pleasure-ground or garden style of scenery, not only for the reasons above indicated, but because a ground of this character can be consistently and suitably maintained at much less cost; because, also, it will allow the necessary conveniences for the enjoyment of it by large numbers of persons to be introduced in such a way as not to be unpleasantly conspicuous or disastrously

incongruous; and because it favors such a distribution of th who visit it that few shall be seen at a time, and that the gro shall not be overcrowded.

"A landscape in order to be beautiful must have all its p stamped with a common idea, and contributing to a single se tion. If it gives the lie here to what is said yonder, it destr itself, and the spectator is in the presence of nothing but a n of senseless objects."

The north meadow in Central Park, New York, has an area nineteen acres; this area is greatly exaggerated to the obse by the judicious arrangement of the planting, opening up l lines of sight, and broadening here and there into large expan of turf. The sheen of the grass, the varied tints of the foli the low-lying hillocks crowned with large forest trees, the g bowlders entirely exposed or only half buried, the meadow yond running back to seemingly unknown distance, — all tribute to make the picture one of pastoral beauty. There dignity, there is breadth, repose, restfulness, and yet a sense isolation that is not absolute. It is genuine park scenery t the eye is tempted to linger on and the foot to walk on, and presents, if reviewed as a single feature, one of the best examp of good park work.

The same general features have characterized the work o master-hand, in the long meadow of Prospect Park, Brooklyn, will be secured in Franklin Park, Boston, when completed, time has matured the growths and mellowed the crudities of site.

The landscape gardener must take into consideration all impressive and natural elements of the locality, in the planting any park of sufficient extent to have a distinctive landscape ch acter. The general aim of his work will be to make a harmo ous combination with the dominant characteristics which nat has already stamped upon the site. He will seek a fuller richer development of the essential leading features, simply s ening what is hard, clothing what is bare, filling out what meagre, and enriching what is beautiful, — all in harmony w the original type.

He will thus avoid all novel conceits, all conspicuous ecc tricities, all incongruous intrusions, and be guided by his und standing of the laws of nature and his sympathy with them.

is a common practice to value the decorative work in planting, on any given site, in general proportion to the degree in which it is obviously artificial, new, or peculiar. Thus clumps of trees and shrubs, or beds of flowers and foliage plants, are located in conspicuous places, without fitting relation to the natural conditions of the landscape.

What is needed, therefore, is popular education with respect to the beauty, adaptability, and arrangement of the component parts of successful design in landscape and gardening work.

There are fully one thousand different species and varieties of ornamental trees and shrubs, besides great numbers of hardy flowering plants, all possessing distinct features of beauty, that will thrive in the greater part of the United States. It is an intimate acquaintance with the habit, growth, and ultimate development of the greater part of these that insures to the landscape gardener success in selecting, planting, and grouping the varied specimens, so as to combine all the essential elements, in form, foliage, and color, of a pleasing landscape. The lack of such an acquaintance with the varied characteristics of planting material is one of the most fruitful sources of failure in planting our parks and public grounds.

In employing trees and shrubs for ornamental planting, such a selection and arrangement should be made as will, for the number used, insure the greatest possible degree of beauty and interest attainable.

In a study of natural landscapes, it may be observed that trees, shrubs, and plants bear relation to each other:

First, in the form of groups and thickets, or dense woods.

Second, in open or somewhat scattered arrangements.

Third, as single, isolated specimens.

Fourth, as being wholly absent in places.

The partly open feature of a landscape is most essential, if we would have beautiful parks or public grounds. This treatment affords an opportunity for viewing the grounds at varied points; for admitting cool breezes and sunshine; for the effects of light and shadow; and, most important of all, that degree of general repose and breadth, without which no park or public ground of any extent can be altogether satisfactory. The prevailing idea in planting would seem to suggest the bringing together such specimens of trees or shrubs as possess contrasting qualities;

arranging these group against group, with a slight scattering individual specimens here and there, but all done for making distinguishing and often strongly marked characteristics of kind relieve and offset those of others, without, however, great contrasts in color.

Often a single native tree, with ample space for complete velopment, will, by its form and color, accentuate and bring the contrasting features of other neighboring growths, as si specimens of our native oaks, maples, ashes, and dogwoods phasize and bring into bold relief the sometimes sombre tint our native woods, and brighten the whole landscape in autu by a bold dash of glowing color. It is, however, an intellig use of this material that betokens the skillful and succes gardener.

In the matter of general style and location of groups, it is vious that as a rule the masses must, in all small areas, be plan along the outlying portions of the turf places, keeping the cent open. Such arrangements correspond in principle with natu most effective groupings.

The most delightful natural landscapes show open vis skirted by margins of woody growth, either near or dist which limit and support the former. A special merit of system of planting is, that it tends to give an enlarged idea the size of the grounds so treated. Grounds with the bound shut off by masses of planting, and these masses arranged w irregular outlines, will look larger than they would if the bou ary line were plainly in sight.

The value of a park depends mainly on the disposition quality of its woods and planting, and on the relation of th to other natural features within its limits.

The older the wood, and the less newness and rawness th is to be seen in all the elements of a park, the better it serves purpose. All schemes of planting are based upon orderly, sonable adjustment, involving careful observation of the gro and development of the varied material that composes the pl tations from year to year, the selection and retention of choicest and more vigorous plants, and the removal from ti to time of material planted for temporary purposes.

For this reason a permanency of employment as regards superintendent or care-taker, if he is fully qualified to perf

the varied duties of his position, is desirable. A new broom is apt to sweep away or try to improve upon the work of the old, and may in a day almost destroy the result of careful study and years of development.

The appointment of the executive head, and the skilled gardener, should not be dictated, as is too often the case, by political motives, but by skill, qualification, and entire fitness for the responsible duties of the position.

A change of administration means usually a change in the entire policy of the preceding one. Thus plantations suffer for lack of attention and timely thinning, or open vistas are made where plantations have been massed to hide objectionable features.

The following extract, clipped from a New York paper soon after the appointment of Mr. Samuel Parsons as Superintendent of Central Park, will illustrate this principle, the new broom, in this case, being an intelligent medium of reform in the maladministration of the old one.

The same defects have been noticeable in Prospect Park, Brooklyn, from a like cause, and are being gradually remedied.

The article is entitled:

"RENEWING CENTRAL PARK.

DEFECTIVE MANAGEMENT OF THE TREES AND SHRUBBERY TO BE REMEDIED.

"The necessity of a comprehensive renewal of the plantations of Central Park is insisted upon by Superintendent of Parks Samuel Parsons, who states that a loss of shapeliness, vigor, and, in many instances, of life, has deprived them of many of their ornaments and marred the original artistic effect of the designer. This has largely resulted from stress of weather, but defective management of the original system of planting has been mainly to blame.

"The intention of the designers of these plantations was to create large masses and comparatively immediate effects, in pursuance of which trees and shrubs were set out at short distances apart, the intention being to remove from time to time such plants as showed signs of becoming crowded. The work of thinning has not been persevered in, and all over the park trees and shrubs may be seen whose shapeliness and proper development have been prevented by overcrowding, while in some parts

the plantations have suffered so from this cause that their
moval and renewal is the only remedy. Where the process
thinning can still be pursued to advantage it will be necessary
doing the work to bear in mind the original intention of
designer, so as to find out the particular mass effects of sky li
middle distance, and foreground that were aimed at, and also
comprehend the shadings of color that were intended to be p
duced. In order to accomplish this the missing links of co
and form must be supplied in the shape of fresh trees and shru
and this must be done without injuring too radically the existi
general effects of the park.

"The selection of trees and shrubs for the new plantations
another difficulty which presents itself in connection with t
proposed renewal. During the park's existence of thirty years
has become apparent that many of those planted have prov
unsuited to its soil and exposure. Among these are the Norw
and other spruces, the pines, with the exception of the white, t
mugho, the Cembra, Japanese evergreens, known as the retin
poras, and, among deciduous trees and shrubs, the European a
poplar, alder, elm, and oak. On this account a careful revisi
of the original list of trees must be made, with the aim to use
large quantities such trees and shrubs as have come into use sin
the plantations were made. The work involved in the renew
will have to be done gradually, so as not to seriously mar t
park's general effect, and a system will have to be established
removing only comparatively small portions of groups in differe
parts of the park, new mold and fertilizer being applied where
the operation is carried on.

"For the new trees a draft will have to be made upon forei
and domestic nurseries, and the park nursery will have to be ke
well supplied with young trees in the future, so that the work
transplanting can be readily accomplished at the most suitab
season. An enlargement of the force employed in the park w
be necessary in order to accomplish the work, and the suggesti
is made that one hundred gardeners be employed in addition
the force of twenty-five or thirty now engaged, with the necessa
assistant laborers, which done, the work may be greatly advanc
during the coming year. An estimate of the cost of the propos
renewal is not possible, because the exact condition of thousan
of trees and shrubs and the cost of handling each of them c

only be determined when the work is systematically undertaken."

The value of public gardens, places, or greens, in distinction from parks, is dependent less on the extent of their sylvan elements than on the degree of convenience with which they may be used; those being the most valuable, other things being equal, through which the greatest number of people may be induced to pass while following their ordinary occupations, and without serious hindrance or inconvenience. Therefore, if a piece of ground of one or more acres in the midst of a busy town is laid out and managed with a view to providing upon it the greatest practical degree of plant beauty in trees, shrubs, flowers, and turf, on the same general principles that a private garden for the same purpose would be, it will be of comparatively little use; for the walks will be indirect, the low planting of the outer parts will obscure the general view of passers-by, and there will be frequent crowding, jostling, and disturbance of quiet.

Neatness and the maintenance of orderly conduct among visitors in such a ground becomes also exceedingly difficult. It is much better to plant and decorate them in such a manner as will not destroy their openness or cause inconvenience to those who have occasion to cross them. For this purpose their plans should be simple and generally formal in style, their passages should be broad and direct, and they should be provided with seats in recesses (preferably) or on the borders of the broader paved or gravelled spaces, leaving ample room for free movements. The green effects of the grass, accentuated by the shadow effects of trees, properly selected and grouped, should be made the chief and most important feature of their treatment. The trees should be high stemmed and umbrageous, and flowers and delicate plants little used except in vases or as fringes of architectural objects. Union square, New York City, is a good example of this style of treatment.

Architectural adornments may properly be employed in small parks, so long as they do not seriously interfere with the open grass effect. There may be even busts or statues (if artistic in design), but especially suitable are drinking fountains, and fountain basins, with great sprays of water. The fountain basins may be effectively ornamented with lotuses, water lilies, and other decorative water plants. All such adornment of small city squares

or greens tends to appropriately enliven and enrich the ge
appearance of a crowded city, where the effect of everythi
artificial, and more or less formal or tedious.

In the city, the surrounding conditions are not primarily f
able for the growth of plants. The air is apt to be hot, dry,
dust-laden, if not actually impure. Consequently the soil sh
be thoroughly enriched, and the most vigorous and hardy t
and shrubs employed. Evergreens seldom do well in
crowded cities. It is better to plant certain hardy, decid
trees and shrubs, such as the Privet, Weigela, Snowball, *Sp*
opulifolia, American Thorn, Philadelphus, Honey-Locust, A
can Linden, Norway and Sugar Maples, and the Oriental P
trees, than to meet with failure by the introduction of other
hardy material.

The Persian rug in flowers or foliage plants is an admir
thing properly placed, but then it is not always in harmony
the natural effects suitable to a special surface of greensw
Carpet or ribbon gardening, artistically composed, is both ri
and proper in its way, only it should be subordinated to, as
as coördinated with, other compositions of color throughout
entire system of planting on any special lawn. Color for alm
every one is a great and positive delight. This delight may
more sensuous and less purely intellectual than that inspired
agreeable form, but it belongs more truly, nevertheless, to
restful physical pleasure associated with the lawn. If garden
were all artists, we should have fewer examples of incongru
in both form and color.

A knowledge of plants, and the possession of an adequate s
ply, does not always insure a satisfactory grouping and mass
of them. There is needed an artistic sense of form and co
effects that, if not inborn, comes only with observation, readi
and an innate love of the beautiful. A successful propaga
will not necessarily be a good lawn decorator. In addition
this special fitness, there must be a general plan, carefu
studied as to its application to the locality and surroundings
be treated. A ground plan should be made, drawn to a scale,
the locality to be embellished, and the beds or groupings locat
and carefully studied as to perspective and outline. The pla
should be selected with reference to height, form, and color
each individual bed, simply considered as a part of the gene

scheme for the whole plan of decorative work. In this way only can a complete and satisfactory result be secured. The flower garden treated in any other way is simply an aggregation of detached effects that have no reference to a complete design.

It would be impossible for me in this paper to specify in detail just what trees, shrubs, or plants are to be used, and what general plan of arrangement should be followed, to arrive at satisfactory results in every case. The whole matter is a question of taste, experience, and the faculty of adapting the design to the especial locality to be treated. One might as well attempt to make a general plan for a park and apply it to every park to be improved.

In the latter case the landscape architect or gardener secures primarily a detailed topographical survey showing the inequalities of the surface and all objects covering it. He makes a careful study of the surroundings, and the general topographical features to be included in the territory to be improved. The general scheme of his work will be largely dictated by the existing conditions and the environment.

The same careful study should be made by the gardener for any plan of ornamental planting, either of trees and shrubs or of purely sub-tropical and floral decoration.

To have on hand a certain number of decorative plants and to place them properly and expeditiously, with due regard to their immediate environment, requires more than the usual ability of the average gardener.

It is to be hoped that the "Theory and Practice of Landscape Gardening," now the subject of special study at the St. Louis Botanical Gardens and the Bussey Institution, will produce a class of gardeners well fitted to harmonize the general scheme of park ornamentation; to emphasize, in the larger parks of sylvan character, the natural beauties of the localities to be treated, by a judicious admixture of the ornamental features of planting; confining the floral work, if any, to the immediate vicinity of the refectories, terraces, fountains, conservatories, and other architectural embellishments, and reserving the main features of the park for woods, lawns, water effects, and natural scenery.

In the smaller city parks or places such a gardener would construct as direct and broad lines of transit as would be consistent with easy and graceful lines; he would secure ample lawns and

umbrageous trees; he would mass the shrubberies, if used, i groups of a kind for effects of color in flower and foliage; and, flowers are used, he would harmonize these, by the introductio of sub-tropical or foliage effects, with the other features of th park, without too glaring a transition from the natural to th artificial form of embellishment. To do all this involves a car ful study of the growth and habits of plants, the proper compos tion of soils to produce the best results, a knowledge of form an color to properly group and blend the many combinations of lea and flower that modern introductions have made availabl so as to combine effects that will be in harmony, and present picture that will heighten, and not mar, the main features of th garden.

In Washington Park, Albany, N.Y., there are no obtrusive co structions, no bizarre effects in floral design or color, no glarin tones in the foliage, but the general impression made upon th visitor is that of a restful, pleasing landscape, well kept an tastefully arranged; and yet there is a very generous use o flowers and bedding and sub-tropical plants, supplemented b special exhibits of foliage and bench plants in July and Augus and chrysanthemums in October and November. In addition t this are shrubbery borders, enlivened with selected perennial and these are sometimes massed for especial effect of colo Mixed borders have been made in connection with a screen o flowering shrubs as a background (one of the most effectiv methods of using perennials), the foreground being shaded dow to the bordering walk by perennials, arranged somewhat as t height.

Where detached masses of color are desired, this effect i secured by massing Larkspurs, Hollyhocks, Sunflowers, ta Phloxes, Lilies (candidum and auratum), and Pyrethrums in solid blocks, each variety in a bed or bay by itself, thus se curing color effects long after the shrubberies have ceased t bloom.

In these borders, and generally throughout the park, the plant or groups are properly named, thus affording the public an op portunity of becoming acquainted with the many varieties o plants used. The following is an extract from my report of th current year to the Board of Commissioners of Washington Park Albany, N.Y.:

"The floral exhibits from early spring to the middle of November, both in the open borders and during the midsummer and fall exhibits in the Lake House, have afforded the public an opportunity of seeing a large range of decorative plants, with a number of recent introductions of merit. The June display of hardy roses was worthy of especial mention, covering a range of one hundred or more varieties, and embracing more than two thousand specimens. The exhibition of border plants, supplemented by special exhibits of specimen palms of many varieties, agaves, and tender stove plants, utilized in some localities especially adapted for their display, makes the exhibit in Washington Park somewhat exceptional in character, and particularly attractive to plant lovers."

"The midsummer exhibit of caladiums and other foliage plants was largely attended. This exhibit gave striking proof of the fact that the love of color and form in foliage is as attractive to many as flowers."

I add also the following from the "Country Gentleman:"

"The third annual exhibition of chrysanthemums grown in the Washington Park greenhouses was held in the Lake House, November fourth to eighth, and marked a steady advance. Just how many plants were shown it would be hard to say, additions being made from time to time as new blooms developed; but there were over two hundred varieties, against one hundred and forty last year and eighty the year before. There were three collections — the main one being "selections from stock of leading growers;" the smaller ones, "Washington Park seedlings" and "Japanese Seedlings." These two are of special interest, both as to form and color. One of the most vigorous of the Park seedlings — seed sown last January — has been trained on a fan-shaped trellis, and bore over four hundred white blooms! In richness of color, delicacy and variety of form and tint of petal, the Japanese seedlings were preëminent. They formed a complete flower garden in themselves, an effect never produced before, we think, by any single flower except the chrysanthemum."

The term "sub-tropical" is popularly given to flower gardens embellished by plants having large and handsome leaves, noble habit, or graceful outlines. It simply means the introduction of a rich and varied vegetation, chiefly distinguished by beauty of

form, to the ordinarily flat and monotonous surface of the gard
This system has taught us the value of grace and verdure an
masses of low, brilliant, and unrelieved flowers, or rather, l
reminded us how far we have diverged from nature's ways
displaying the beauty of vegetation. Sub-tropical gardening l
taught us that one of the greatest mistakes ever made in
flower garden was the adoption of a few varieties of plants
culture on a vast scale, to the exclusion of interest and varie
and too often of beauty and taste.

The ability to make a good selection of the most beautiful a
useful from the great mass of plants known, is the gardene
pride, and in no branch must he exercise it more thoroughly th
in this. Some of the plants used are indispensable — the diff
ent kinds of Ricinus, Cannas in great variety, Colocasias, Pal
many fine kinds of Dracænas, Yuccas, Agaves, Cycads, Pamp
grass, Arundos, Rheums, Acanthuses, Wigandias, *Rhus gla*
laciniata, *Aralia Japonica*; — all of these, and more, are used
good advantage.

Where such plants are not available, by a judicious selecti
from the vast number of hardy perennial plants now grown
this country, and by associating with these flowering shru
selected for special grace, height, and beauty of outline, a p
manent garden can be secured that will, with but little care, o
rival in beauty any attempt at formal bedding upon the old li
of carpet work, and never cease to be a "thing of beauty and
joy forever."

The true motive is for a restful, quiet arrangement of bor
planting and grouping, for harmony in color, and not for glari
striking effects. Much of this effect is secured by the aid
foliage plants, and not with flowers.

There are two localities set apart for floral exhibits in t
open borders in Washington Park, where the design of t
grounds is somewhat formal, and at no other points are flow
used. The interior of the park is treated in a simple mann
the main feature of the tree growth being the size and beau
of the elms. A large number of ornamental trees and shrubs ha
been introduced, but they are so distributed as not to becor
prominent features of the landscape, the shrubs being confined
borders for screens, or massed for color effects, or treated as spe
mens, with ample space for individual growth and expression.

A portion of the lake in Washington Park has been set apart for the display of hardy and tender aquatic plants. The hardy varieties are planted permanently in beds depressed about two feet below the water surface. The tender varieties are removed in the fall and remain dormant, generally as bulbs, in the greenhouses, until the water is warm enough to put them in the lake the following summer, the bulbs being forced into active growth early in the spring. There is no feature in the park that has given such universal satisfaction as this aquatic plant display, and none that with ordinary care will more fully recompense the gardener.

The lake margins are treated naturally, having no stone or artificial encircling wall. The banks are well shaded, and provision is made at frequent intervals to reach the water by circuit walks and expansive beaches. The lake margins immediately surrounding the aquatic garden are planted with water-loving plants, and back of these is selected shrubbery, so that the transition from the aquatic garden to the outlying features of the park is gradual and not discordant.

The design of this paper has been, in a measure, to moderate or curb the tendency to too generous a use of flowers, arranged in geometric or formal designs, either in urban or suburban parks, and the concentration of such effects, when used, in localities especially adapted and heretofore suggested for such displays; blending such exhibits with their immediate environment, by shading down the color tones, so that, to the observer, the transition may be gradual, from the natural to the artificial, or *vice versa*, without too sudden a change in form or color; and, furthermore, I recommend the use of fewer flowers and more foliage plants. Scattered, detached effects are to be avoided. Treat the garden as one composition, each bed or group of plants being a necessary and integral part of the whole picture. Either mass for color effects in foliage or flower, or select for grouping, such shrubs as are noted for individual form and expression, giving ample room for development, and space to view them from all sides. Rely mainly upon the lawn, and natural effects of trees and shrub planting, for the impression to be made, and subordinate the artificial to the natural.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 21, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

GRASSES.

By Professor F. LAMSON-SCRIBNER, B.S., Chief of Division of Agrostology, United States Department of Agriculture, Washington, D.C.

Coming to Boston to address you on the subject of grasses, is like carrying coals to Newcastle, for is not this the home of the widely known and justly celebrated author of Flint's "Grasses and Forage Plants"? But the subject is a broad one — as broad as the world is wide, and as varied as it is broad; so broad, and embracing so many diverse lines of investigation, all alike interesting, that I have found it exceedingly difficult to determine what subjects to take up, or where to draw my limitations. Good things will stand repeating, and in a multitude of counsellors there is safety. New ideas are rare indeed, but in the application of old ones may spring a happy thought of use to some one, and there always exists this possibility to encourage the speaker.

"The grass faileth; there is no green thing," is an apt expression of the extremity of desolation. Where there is no grass, there are the absolute deserts. Where our best grasses abound, and where they receive the most attention, there we find our highest civilization and greatest prosperity. Destroy the rich verdure of our pastures and meadows, and how much of the pleasure as well as the profit of the farmer's life would be blasted. Destroy the little grass plat of the contracted yard of the citizen, and how much would the enjoyment of domestic life be narrowed.

Grasses may be considered the plebeians among the families of the vegetable kingdom. They are ubiquitous, and in all temperate regions innumerable. In their number of species they constitute one-fourth of the flowering plants of the arctic zone, one-twelfth of those of the temperate region, and from one-twelfth to one twenty-fifth of those of the tropics. In the countless myriads of individuals, particularly in the temperate zone, grasses far surpass all other orders of plants. They form the rank and file of the army of plants; but here, as in armies of

men, it is the rank and file that does the real service. There are, however, lordly members among the grass family, for some of the tropical species vie with the tallest trees in height. The immense bamboo forests of India are forests of grasses, and to the dwellers of those regions they are as useful as are our own forests to us. They furnish material for the construction of their houses and household furniture and domestic utensils, articles of ornament, and sometimes even articles of clothing. Some of the bamboos furnish drink to the thirsty traveler; others occasionally supply food; and several times within historical periods have the fruits of these bamboos saved hundreds of thousands, if not millions, of people from actual starvation. So generally useful are the bamboos that their products have entered into the commerce of the world.

A mere enumeration of the diverse uses of grasses would more than occupy the time which has been allotted to me here; but at the risk of wearying you, I must briefly outline the more important of these. Grains, the product of the cereal grasses, form the staple food of more than four-fifths of the human race. Wheat is a grass, and the world's production of wheat is estimated at two billions four hundred millions of bushels. Rice is a grass, and the production of this cereal in the East exceeds one million tons, and feeds one-third of mankind. Indian corn, that king of grasses and peculiar product of America, is one of our greatest sources of income. Its cultivation now extends over ninety degrees of latitude and has been carried to all parts of the world. Oats, the most nutritious of all grain foods, barley, and rye are members of the grass family; and aside from these grains, there are a number of grasses which furnish human food, particularly to the natives of Southern Asia and the wild tribes of Africa, the value of whose product cannot be estimated. In addition to the direct usefulness of these grain-bearing grasses to man, several are used very largely to supplement the forage of our domestic animals. They have a further use also, in the production of alcoholic drinks. Nearly half of our sugar supply is derived from grasses. The world's production of cane sugar is about three million tons. What is said here of the products of the cereal-grasses indicates only in a slight degree the great usefulness to man of a very few members of the grass family. A larger number are scarcely less useful, although indirectly.

These are the grasses of our meadows and pastures, whic furnish us our beef and mutton, our butter and milk; which fee our horses, the noblest of our domestic animals, and still amon the most useful, in spite of electric railroads, horseless carriage and bicycles. The money value of the hay crop of the Unite States for the year 1894 was estimated at nearly half a billio dollars, and the value of the grasses in pastures of the Norther States may be considered equal in value to the hay produce while in the Southern States and the great grazing regions of th West, the value of the pasturage far exceeds that of the hay cro A conservative estimate, therefore, of the annual value of th grasses of the meadows and pastures of this country alon exceeds a billion dollars.

"Before dismissing this subject of the utility of grasses i furnishing food for man and the animals he has domesticated, w shall do well to pause for a little reflection upon its relation t the industry, commerce, and wealth of nations, as well as t man's subsistence — our dependence not only upon the cere grasses for our staple vegetable food, but indirectly upon th forage grasses for our supplies of animal food, namely bee mutton, venison, and dairy produce, as well as for various anima substances such as wool and hair, hides and skins, bone and hor oil and tallow, used for textile and other manufactures (notabl woolen fabrics and leather), or for domestic purposes — th large proportion of the world's inhabitants engaged in agricul ural (chiefly cereal cultivation) and pastoral pursuits, in som countries from seventy to ninety per cent of the adult male po ulation — the vast internal and foreign trade connected with th distribution of agricultural products by land and sea — th numerous and important industries concerned in operating upo one or other form of this produce in order to prepare it for con sumption; and lastly, the enormous capital employed in all thes industrial activities, and the consequent accumulation of wealth It is only when we take a comprehensive survey, such as her indicated, that we are able to form some conception of the tran scendent importance of the Gramineæ."[1]

There are a number of minor uses to which many species o grasses have been applied; probably the most important is th material they furnish for paper-making. Several of our native

[1] William Hutchinson in "Handbook of Grasses," 1895.

species furnish a good fibre for this purpose, but the grass which has been used most largely in the manufacture of paper is the Esparto grass of the Mediterranean region. The quantity of this grass annually imported into England at present amounts to over two hundred thousand tons, valued at three-quarters of a million pounds sterling. Some grasses are used in the manufacture of cordage, or hats, or of matting; others make thatch; some are employed in medicine; others yield perfumery. Among the natural uses of grasses may be mentioned that of binding drifting sands and the protection of our coasts and river banks from the action of the tides or floods, and their use in protecting the soils of our fields and meadows by the covering which their turf affords. They extract from the earth and the air elements which they transform into substances that serve as food, and in doing this they help to purify the air we breathe.

Contrary to the general idea, there exists among grasses a remarkable diversity of form. So varied is this that botanists have already defined nearly four thousand distinct species. This diversity appears throughout all the organs of the grass. In some the roots are simply fibrous, and the plants grow in tufts or bunches, as Sheep's Fescue and Orchard grass; others have what we call creeping roots, and it is among these that we should look for the best turf-forming species. Some have stems less than an inch in height and appear like mosses covering the soil and rocks; others attain the height of our tallest forest trees. Some have leaves as fine as the finest thread; in others the leaves are those of the ideal blade of grass, while others again have leaves like those of palms, or leaves as short and as broad and as round as those of the well-known smilax. To explain the details and the varieties existing among the flowers of grasses would be wearisome. That grasses have flowers is an idea rarely entertained by any except botanists, and I have frequently heard the remark, "I did not know that grasses had flowers." They do, however, although their special characters may differ from those of other plants; and provision exists here, as it does throughout nearly all the tribes of vegetation which bear flowers, for securing cross-fertilization. The flowers of grasses are inconspicuous and secrete no nectar. They are not, therefore, attractive to insects, which play so important a part in the process of cross-fertilization. The pollen of grass flowers is

dry, light, and powdery, and easily blown about by the wind and cross-fertilization among grasses is effected by this agency.

If the variety in the external form of grasses is wonderfully great, their internal structure is scarcely less so, and the histological studies of grass stems, leaves, and fruits are exceedingly interesting. Intricate problems in mechanics are exhibited in the structure of the slender cylinders which constitute the grass stem and which, in many cases, possess a strength most surprising. The amount of mechanical tissue entering into the structure of the stem which holds a heavy head of wheat is insignificant, but the disposition of the various elements of this tissue gives it the strength necessary to perform its proper functions. Again, the leaves of grasses, which many think so much alike that they would consider the expression "as like as two blades of grass" as forcible as the more common phrase "as like as two peas," exhibit a diverse and marvelous interior structure. No more delicate tracings or beautiful designs of lace work can be imagined than are presented by these same grass leaves when viewed under the microscope. The designer might well study these tissues, for in them he would find many new figures and combinations of lines the beauty of which he could not hope to excel, and the reproduction of which could not fail to receive the highest admiration. In their internal structure as in their outward contour, the leaves of grasses present such definite characters that these may be used to distinguish species. A minute transverse section of the leaf of Kentucky Blue grass, which one could barely see with the naked eye, would, under the microscope, present characters which at once distinguish it from all other grasses. They are totally different from those exhibited by a leaf of Orchard grass, and these again are wholly unlike those of Meadow Fescue. There are certain cells in the leaf tissue, running from the base to the summit, which are larger and have thinner walls than the surrounding cells. These special cells readily absorb or give up moisture, and because of this property they exercise the mechanical function exhibited in the expansion or opening out of the leaves, or their contraction and rolling together.

The provisions which nature has made for the distribution of grasses is an interesting subject, and one worthy of passing notice. In many cases the seeds are covered with delicate chaff-like scales, or are furnished with winged or feathery appendages,

enabling them to be widely distributed by the winds. Others are provided with hooks or barbed spines, by means of which they become attached to clothing or to the wool or hair of animals, and are thus carried about from place to place. Others are so constructed that they will float upon the water, and may be carried long distances by rivers and streams or tides. Others again have firm protective coatings, so that they may pass uninjured through the stomachs of birds or animals feeding upon them, and are disseminated in this way. These are among the natural means of distribution. The manner in which grasses have been distributed through the agency of civilization and commerce is no less varied.

The diversity of form presented by grasses is accompanied by an almost equal diversity in their station, or place of growth. Some are limited to the Arctic regions, others are found only in the tropics; some grow in the sand along seacoasts, others again are confined to the highest mountain-tops near the limits of perpetual snow; some flourish only in moist meadows, others exist in the most arid deserts; some grow in the shadows of forests, others thrive only upon open plains; some are confined to soils heavily charged with lime, others make vigorous growth where practically no lime exists. And it is with all these varied peculiarities which grasses present, that the student of these plants must become familiar, in order intelligently to direct his efforts to improve the forage and grazing resources of the country, the prime feature of interest that the farmer has in this subject.

We will now limit our remarks to the consideration of the economic grasses of this State. It is hard to say which is the most important of these. But if one pays a visit to Cape Cod, as it was my good fortune to do last summer, he will certainly be struck with the great importance of Beach grass, and the special value which it possesses for binding the drifting sands of the coast. Beach grass extends along the sandy shores of the coast just above the reach of the higher tides, from Maine to Virginia; but nowhere along our shores will one learn to appreciate more fully its usefulness as a sand binder than in the vicinity of Provincetown. The natural growth of Beach grass at this point has done much towards checking the progress of the sand dunes towards the town and harbor, the filling in of the latter being threatened by the moving of these great bodies of

sand. The Harbor and Land Commissioners of your State hav undertaken to further check the drifting of these sands b transplanting Beach grass to the most exposed points, whe presumably it will be most effective. The setting out of th Beach grass was undertaken in May last, and when I saw th plantations, in August, the operation was perfectly successfu and the best results may be confidently expected. This grass the most valuable sand binder of our coast, and it should b made use of more than it is. We do not need to import th seeds of it, as has been done, nor do we need to depend upo seeds for propagation. The simplest way, and at the same tim the most certain means of propagation as well as the cheapest i the end, is that of transplanting, which may be done in th spring, or in some localities doubtless in fall.[1] There is hardl any section along the seashore where Beach grass could not b used to advantage; if it does not exist near by, it may be readil and cheaply obtained. For the binding of embankments, wher there is a proportion of good soil, Couch or Witch grass is avail able. If a good turf is desired, there is nothing better tha Kentucky Blue grass, better known in New England as Jun grass.

There are in Massachusetts about sixty thousand acres of sal marsh, and it may be of interest to stop a moment to conside the plants that enter into the composition of the hay whic these marshes afford. These salt grasses are the natural produc

[1] The following letter from Mr. L. W. Ross is of interest in this connection:

BOSTON, MASS., March 30, 1896.

PROF. F. LAMSON-SCRIBNER, *Washington, D.C.:*

DEAR SIR: Agreeably to your request when I met you in Boston, I will say that I visite the Province lands at Provincetown, Mass., on March 25 and 26.

The plantings of *Ammophila arundinacea* which you saw last summer have proved complete success. The winter has been an unusually windy and tempestuous one. No withstanding this, however, the plants have held the sand on the area planted securely i place and no "breaks" or "blow-outs" have appeared, to require any attention on the pa of our Superintendent during the winter. This I consider somewhat remarkable, for w expected portions of it to be blown away. The whipping of the grass by the winds ha broken off and blown away approximately about one-half of the bulk of grass above ground

It has always been considered by those who claim a knowledge of Beach grass planting that the spring season is the only one in which it should be planted. Last fall we continue the grass plantings beyond the point where we left off last spring, and contrary to claim made, at the present time it shows to be in better condition and to have stood the winds o the winter much better than the grass planted last spring.

Yours respectfully,

LEONARD W. ROSS,

Forester to Board of Harbor and Land Commissioners.

of the marshes, and the salt hay they furnish is a clear gift of nature, costing little beyond the labor and expense of harvesting. The cutting of the hay is determined more by convenience than by the selection of time when it would be most valuable for fodder, which would of course be when the principal grasses are in bloom; and the methods employed in harvesting are in many cases, and sometimes of necessity, quite primitive. The hay is cut, raked into small bundles, and carried to the stack, which is usually supported upon a circle of piles, raising it above the tides. During the winter season this hay is hauled away for use as fodder or litter or mulch, or shipped to the larger towns for packing purposes. On the higher and dryer marshes other methods of harvesting may prevail. The characteristic grasses of the marshes are the Spartinas. There are several species of these, and several of them have a very wide distribution along our coasts, and occur also upon the coasts of Europe. One of the largest of these Spartinas, growing where there is a daily flow of tide, chiefly along the ditches and creeks, is the common thatch or creek sedge. It is conspicuous by its size and its broad, spreading, shining leaves. It imparts a disagreeable flavor to the butter and milk from cows fed upon it, and is rarely used for fodder, but chiefly for thatch or litter. The finer variety of the same species is more widely scattered over the marshes proper, growing to the height of from one to two feet. This has narrower, more erect leaves, and is of a lighter green color. Like the large form, it imparts a disagreeable flavor to the milk from cows eating it. Red-salt or Fox grass is another Spartina; a smaller species with wiry stems and slender leaves, and is one of the best known of the grasses of the salt marsh, and one of the most valuable. It makes fairly good hay where better cannot be had, and is a particularly useful species for packing crockery and glassware. The dicœcious Spike grass, less known than the others, but fairly common on the meadows, also furnishes good packing material. I saw this covering considerable areas on the low marshes at Cape Cod, the male plants and the female plants occupying separate areas, and conspicuous by the yellowish hue which they gave to the vegetation. It is interesting to note that the various grasses of the salt marshes do not ordinarily grow intermingled, as do the species which compose our meadows and pastures, but each holds exclusively areas of greater or less extent.

The largest and most striking of our native grasses, *Phragmit communis*, is occasionally found upon our salt marshes, althoug it is not limited to these localities. It is a species widely di persed throughout the temperate regions of the world, growin along the margins of rivers and freshwater lakes. It has remar ably long and deeply penetrating roots, and is especially valuab as a sand and soil binder. There is a small area of this gra growing in the sands near the water's edge on Cape Cod, whe it is exposed to the extreme action of the winds and storm tide It has existed there for many years, and its power to withstan the elements and fix the sands is clearly demonstrated. Whil its foliage may not resist the cutting action of the blowing sand as do the leaves of Beach grass, its power to resist the action o the waves is greater. Wherever the waves of the higher tide reach the sands occupied by Beach grass, it is soon destroyed.

Upon the higher portions of the marsh, which usually escap the ordinary tides, occur several fine grasses of excellent quality Among these are the Creeping or Red Fescue, Sea Spear gras Creeping Bent or Brown-top, and Black grass. The Creeping Ben or Brown-top is one of the best and most tender grasses for fod der which the marshes produce. It is only a variety of the wel known Redtop of our meadows, with stems which are more or les creeping at the base, and with a less spreading panicle. Se Spear grass (*Glyceria maritima*) is not uncommon on the marshe of the New England coast, extending southward to New Jerse It is a tender grass, liked by cattle, and when abundant make a valuable addition to the salt hay designed for fodder. Re Fescue (*Festuca rubra*) is a native, and occasionally appears upo the marshes, although more abundant upon the sandy soil o waste lands bordering them. It is a grass of excellent quality and often enhances considerably the value of marsh hay. O all the grasses of the marshes proper, there is none more highl prized for hay than Black grass (*Juncus Gerardi*), which extend all along the Atlantic coast, from the Gulf of St. Lawrence sout to Florida. This, as you will notice, is not a true grass, but rush, its botanical characters being quite distinct from those o the Gramineæ. Its slender erect stems are from one to two fe high, somewhat wiry, yet soft and apparently palatable to stock It contains less fibre and a higher nutritive ratio, as is shown b chemical analyses, than Timothy and Redtop.

A more familiar topic, and one of greater interest to the most of us, is the grasses of our meadows and pastures. They are the grasses which feed our cattle; they are the grasses which brighten and beautify the landscape. They are numerous in species, and a mighty host in individual numbers. I would it were possible for me to introduce to you the various members of the grass family which have made a home upon our soils. Each one has a history; each one has its peculiar characteristics, distinguishing it from its neighbors. Each one has its field of usefulness, and many of them stand ready to become far more useful, if we will but extend to them the helping hand which we have held out to the few cultivated grasses, to shield them from the attacks of enemies and rivals, and aid them in their struggle for existence. They are all beautiful in their gracefulness, and nothing adds more charm to the landscape than a field of waving grasses or a pasture of emerald turf. Did you ever stop to think of one of the prime features of these grasses which makes them so useful to man? It is this: their power to exist under repeated cuttings or under the continued grazing and tramping of stock. What other plants possess this quality, even to a slight degree? To graze or mow the turf-forming species, and walk or tramp upon them, instead of destroying them, apparently adds to their vitality, and surely improves their quality. This certainly seems like a provision in nature, directed by an all-wise Providence, for the good of mankind.

I must confine myself to a few species, those of greatest recognized importance for hay, for pasture, or for the lawn. The best wild or native hay grasses are Blue Joint, Fowl Meadow grass, a species of Glyceria, and one of the Muhlenbergias or "drop-seeds." These are valuable in the order named, and often afford in our low-lying meadows a large bulk of native hay of excellent quality. Like other species of grasses, they respond readily to good treatment, and the specimens I have here to show you, clearly exhibit their capabilities. Timothy, Meadow Fescue, Orchard grass, Rye grass, and Redtop are the chief and best known of the cultivated or so-called "tame" grasses for the production of hay. In the markets, Timothy is the recognized standard by which the value of other grasses is estimated. It is the farmer's gold coin, although it does not appear to me to be equal in some respects to other varieties. Its clean appearance, even

growth, fair productiveness, and easy propagation make it favorite grass. The presence of Meadow Fescue indicates a g soil, and upon well-drained clayey lands it is one of the b grasses we can cultivate; it is alike good for hay and pastura Where the soil is more moist, but deep and strong, the La Fescue (*Festuca arundinacea*) may be cultivated. It is one the most productive of the hay grasses. Almost equally prod tive on soils suitable to it is Orchard grass, and by many of farmers this is regarded as equal, if not superior, to Timothy. has a serious fault, however, of growing in bunches or tussoc It is not a turf former, and when cultivated the seed should sown thickly, and it is a good plan to add some other species a filler. This objectionable habit of Orchard grass may be ov come in a measure by heavily rolling the fields in early sprin Were it not for this tussock-forming habit, Orchard grass wou make one of the best of grasses for pastures, because of the ear and abundant production of tender leaves. Rye grass, so popul in England, has never come into much favor here, although it usually recommended as an ingredient for mixtures designed f permanent pasture. On very rich soils, where the ground fairly moist and the atmosphere humid, its productiveness is ve large. It will make a fair turf if well cared for, and may used alone for lawns, but not in mixtures. Redtop is one of t finest and best of our hay grasses, especially for low meadows, b is less productive than other sorts. The requirements of a go hay grass are productiveness, hardiness, and adaptability to t soil. It must also be nutritious, rich in flesh-forming element and possessing little fiber, and must be palatable to stock. I w not attempt to discuss here the question of mixtures for perm nent or temporary meadows, further than to say that they mu be based upon the conditions of the soil and climate and t wants of the farmer. Regard must also be paid to the time of succession of blooming of the several varieties which may sown.

Our pasture grasses are more numerous than those which yie us hay, and a just consideration of them would more than occu the time of a single lecture. The most important kinds a Meadow Foxtail, Kentucky Blue grass, English Blue grass (*P compressa*), certain varieties of Redtop, and species of Fescu Meadow Foxtail is one of the earliest, quite productive, and

many is very highly esteemed. It is recommended in all mixtures compounded for the production of continuous herbage through the season. Kentucky Blue grass is a good turf former and a good pasture grass where the land is rich, but does best upon strongly calcareous soils. It is the grass which has made the pastures of portions of Kentucky and Tennessee so justly famous. English Blue grass is, I think, a better pasture grass for New England than Kentucky Blue grass. It will grow on a greater variety of soils. It will grow on soils so thin and poor that little else will grow. On good land its productiveness is scarcely inferior to that of Kentucky Blue grass, and it is equally tender and nutritious. It makes a very firm sod, and withstands the tramping of stock better than many other kinds. The cultivation of this grass in certain portions of Virginia has changed poverty-stricken districts to areas of wealth and prosperity. This has been effected by the cultivation of this English Blue grass and the raising of dairy stock. From my knowledge of New England pastures, I can think of no grass that I would more highly recommend. Lowland pastures should always contain Redtop in some of its varieties. It makes the cleanest, nicest-looking, and sweetest turf of any grass I know. The fine-leafed varieties should be selected for cultivation in pastures. Of the Fescues, Meadow Fescue is a valuable pasture grass, as already intimated, where the soil is good; and on sandy soils Red Fescue is an excellent variety. On the dry uplands Sheep's Fescue is perhaps one of the best species we can cultivate, associating with it English Blue grass.

There is nothing more pleasing to the eye or more beautiful than a well-kept lawn. There is nothing that speaks more strongly for the owner of a house than the lawn which fronts it. The lawn upon the outside should be like the carpets within, and be kept clean with equal care. It is capable of giving pleasure to vastly more people than can enter the door and see the beautiful Wiltons and moquettes, for every passer-by may enjoy it. A good lawn is one of the simplest things to produce, yet one of the most difficult; at least one may reasonably judge it to be difficult by the vast array of wretched failures that appear in almost every neighborhood. What the lawn needs is good turf, and the climate here is excellently adapted to the production of just such turf as is most desired. There are a great variety of

grasses which will produce turf of pleasing appearance un
careful management, but this turf varies in fineness and quali
according to the species used to make it. We do not need a
lawn mixtures to make a lawn. The worst initiative in t
making of a lawn is the sowing of a mixed lot of seeds. T
best turf I have ever seen was composed of single varieties
pure cultures, and their beauty fully warrants the extra care a
expense necessary for their production. I am happy to be a
to show you pictures taken in the most famous grass garden
or turf garden as the manager calls it — in this country. Y
have all heard of it, and some of you have doubtless met t
genius who has developed it. This garden is tended with scrup
lous care and given daily attention. Not a weed, not a blade
grass foreign to the variety cultivated, is allowed to appear
any of the plots, or if appearing it is at once removed. It is
all times beautiful, but under the slanting rays of an afternoo
sun, the beauties of this garden are most clearly brought ou
At a short distance it looks more like unrolled webs of carpet
bands of delicately and variously tinted ribbon, than anythi
else one can suggest; and here we are able to see the turf-form
ing qualities (under the treatment given them) of many grasse
and of many varieties of a single botanical species. To stud
the texture of these is most interesting, and the illustratio
which I have to show you will in a very faint degree bring ou
the differences of texture they exhibit. The finest and be
varieties of turf, and consequently for lawns, are those
Festuca and Agrostis. Some of the forms of Agrostis are excee
ingly fine, yielding what we may very properly term a "nap,
almost as fine and soft as that of velvet. Some varieties
Festuca are no less beautiful and hardly less fine. How thes
grasses would thrive under the shade of trees I cannot certainl
say, but I recall a remark made by Mr. Olcott when asked whic
would do best in the shade. It was: "Those that do best in th
sun." While some may question the exact truthfulness of thi
remark, there may be more in it than we may at first suppos
But there are good turf grasses which will grow in the shade
trees, where the shade is not too dense and they are given
reasonable amount of care. These are Meadow Foxtail and th
Various-leafed Fescue (*Festuca heterophylla*). Crested Dogsta
is spoken highly of by some; also Rough-stalked Meadow gras

(*Poa trivialis*) and Wood Meadow grass (*Poa nemoralis*). If I were experimenting, I should use by preference the Various-leafed Fescue or Wood Meadow grass. Where the lawn is small, it looks best unbroken, but in those of considerable extent, trees and shrubbery may be added to adorn it, and with these ornamental grasses may be planted. There have been introduced into cultivation many grasses of special beauty and attractiveness which may be used with good effect singly or in groups upon the lawn. One of the finest of these and the most showy when in bloom, is the beautiful Pampas grass. Nothing surpasses the elegance of its light and silvery-tinted plumes. Where they will grow, some of the bamboos are used with good effect to decorate the lawns; and the large Arundo with its beautiful white-striped leaves, and the more common Eulalia, and forms of our own Phalaris, belong to the group of ornamentals. Then there are finer and more delicate species sometimes used for borders, and of these we may mention such as species of Love grass and the elegant little Brizas.

As in all families of any size or pretension we always find among the good members composing it a few black sheep, so it is with the grasses. As good as they are, as useful as they are, as beautiful as they are, there are some which by their conduct, by their selfishness, by their intrusiveness, have become obnoxious, and we call them weeds. The worst of these which the New England farmer has to contend with is Couch grass. There are others, but we will not mention names in so goodly a company. It sometimes happens that men who are very correct in all they do under the restraint of home influences and are counted among the elect, when removed from these influences, will stray from the path of rectitude. So it is with grasses. Our much-loved Kentucky Blue grass, which every one esteems as a good and useful grass citizen, has received a bad name away from home. In New Zealand and Australia its habits are such that it has come to be looked upon as a vile weed — a lawless outcast, despised by everybody.

Your President suggested that I tell you something of what we are doing in the Division of Agrostology. Well, the Division is devoted to the investigation of grasses, and, in addition, to the investigation of forage plants other than grasses. From what I have said already, it is evident that the work is broad, and

involves many special lines of study. The work is intensely i teresting, and it is our purpose to make it useful to you all. O main force at this time is directed to the preparation of a wo in which shall be illustrated and described all the North Americ species of grasses, of which there are more than seven hundre I am able to show you the character of the illustrations. Th are all original, carefully drawn, and executed on wood. The d scriptions will be drawn from the specimens, and it is no simp matter to classify these specimens into their proper species, a the botanists among you will understand. During the summe season we have agents in the field collecting the grasses of th country, grass seeds of the more promising native species, an live roots of grasses. These seeds and roots are being prop gated in the gardens established by the Department; and at th same time the material thus gathered is distributed to othe investigators with a view of widening our knowledge by cultura experiments at other points, or is used in making exchanges. W have a large correspondence that has to be attended to, and ques tions are asked us relative to the qualities of various grasses an the kinds to be sown in given localities. We try to answer al these questions, but occasionally one is asked which exceeds ou ability to answer; for example, this, which was actually aske us: "What was the first principal grass that began to grow o what we know as the prairies of Illinois after the drift period o ice age, and the date, if known?" Such questions we are force to refer to a higher authority. Then there are collections o grasses constantly being received from various sources, to b named; this work takes time, for often the collections come fro regions where the species are little known and their identificatio involves much study. The care of our grass gardens consume considerable time, and also the handling of the seeds and th duplicate collections. Our main work, to which our energie at present are chiefly directed, is, as just stated, the prepara tion of what may be termed the "Handbook of North Americ Grasses."

The subject selected for me was "Grasses." It is surel an interesting one, and I shall indeed have failed in my purpos if I have not succeeded in securing your interest in it. I hav found it impossible to do more than to indicate the importanc of grasses, or hardly more than to name a few of their uses o

suggest a few topics for research, almost any one of which would afford an hour's entertainment or profitable discussion. The investigation of grasses has engaged the attention of the ablest men of science, and the study of their development, their classification, their inter-relationships, and their relation to other plants and to man opens a field to philosophy. They constitute the wealth of nations; they feed the world; they minister to the higher esthetic tastes of mankind by their graceful and varied beauty; they heal the sick, and make glad the well.

Discussion.

The lecture was illustrated by means of the stereopticon; views were given of the gardens of the Division of Agrostology in Washington, where the experiments in propagation and cultivation of grasses are carried on; also views of the numerous species of grasses of which the lecturer spoke, some of which showed the type of the illustrations to be expected in "The Handbook of North American Grasses," now in preparation. Bundles of numerous species of grasses were laid out on the tables for examination, each bundle being carefully prepared and labeled with both botanical and common names.

Mrs. —— Wright said that reference had been made to the Buffalo grass of the plains, and asked whether this grass can be removed to other localities, and if so, whether its nutritious qualities will be the same.

Professor Scribner replied that Buffalo grass was cultivated successfully in the grass garden at Washington, but he could not say whether it became less nutritious.

In reply to another question Professor Scribner said that the best English lawns are composed of single varieties of grasses. When asked if Alfalfa was included among the grasses, he said that Alfalfa does not belong to the family of true grasses, but to the clover family; it is one of the most important forage plants of the country.

On being asked whether a lawn could be made of white clover Professor Scribner answered that such a lawn would be unique; he would prefer grasses, but white clover is often used with grass, and in this way will make a very pretty lawn. The color of its leaves is the same as that of some species of grasses. There is an astonishing variety of color in grass leaves; different tints

occur even in the same species. By planting grasses of vario colors a mosaic might be made, if desired.

An unknown gentleman asked whether the line can be drav between grass and other plants used for human food. T answer was that botanically the line can be drawn. Grass popularly used in a very wide sense, often including clover.

Another questioner asked the origin of Couch grass. P fessor Scribner replied that it is a native of this country and also known in Europe. It is commonly thought of as a wee but it gives good crops for a year or two, when it chokes its out. It may be improved by harrowing the sod formed, as done in the West.

Professor Scribner stated that "The Handbook of Nor American Grasses" will be published in the fall of this yea

Benjamin P. Ware asked what is the best grass for sod. T reply was that *Agrostis alba* var. *stolonifera* or Creeping Bent h been shown by Mr. Olcott to be the best for lawns. Mr. Wa then questioned about June grass or Kentucky Blue grass compared with it. Professor Scribner replied that the Fescu make a firm, close sod. Kentucky Blue grass is very fine, b not as fine as the Creeping Bent or Rhode Island Bent.

Being asked if Sweet-scented Vernal grass is good in the law Professor Scribner answered that it is a weed in any lawn.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 28, 1896.

A meeting for Lecture and Discussion was holden today eleven o'clock, the President, FRANCIS H. APPLETON, in the cha

The following paper was read by the author:

MANURING ORCHARDS.

By Professor EDWARD B. VOORHEES, Director of the New Jersey State Agricultura Experiment Station, New Brunswick, N.J.

My main purpose in this discussion of the question of manur for orchards is to show the necessity of studies and inves gations concerning the food requirements of the various frui rather than to point out methods of practice that shall

economical and systematic. We have suggestions from numerous sources in regard to the particular needs of particular kinds of fruit for plant food, but we have in the reports of our experiment stations and agricultural societies very few results bearing upon this subject which have been derived from actual experiment. It is quite natural, perhaps, that this should be the case, because fruit growing as a business, or on a commercial scale, is comparatively new, and because the character of the investigations necessary to be carried out in order to obtain reliable data must be continued. The development of fruit growing as a specific crop has, too, been gradual, and has found its first considerable increase in sections of the country within easy reach of good markets, and upon soils particularly adapted for the purpose, which, perhaps, furnishes another reason for a lack of scientific investigation along this line.

Fruit Crops and Grain Crops differ in Respect to their Needs for Plant Food. — It is obvious, too, that such specific results as have been obtained concerning the needs of general farm crops, as grain and grass, for specific plant food elements cannot be applied with any degree of accuracy to fruit crops, particularly the larger fruits, as pears, apples, peaches, grapes, and plums, because these differ from the cereals, grasses, and vegetables, first, in their habits of growth, second, in the character of the produce, and third, in their relation to soil exhaustion.

In the first place, farm crops, as a rule, require but one year for the entire processes of vegetation and maturation. For fruit crops, with but few exceptions, the purely vegetative processes continue for at least three years, and with many kinds much longer, while after the fruit-bearing period begins the vegetative processes do not cease, but are coincident with the growth and ripening of the fruit. In the second place, the product of the harvest, namely, the fruit, differs very materially in its character from that of ordinary farm crops which mature their fruit and die in one season, because a whole season is required for its growth and development; that is, it is necessary that there shall be a constant transfer of the nutritive juices from the tree to the fruit throughout the entire growing season, while the growth for each succeeding year of both tree and fruit is dependent upon the nutrition acquired and stored up in buds and branches, as

well as upon that which may be derived directly from the soil. the third place, the relation of fruit growing to soil exhaustion very different from that in general crop farming, because orchards there is an annual demand for specific kinds and p portions of soil constituents; it is really a continuous croppi of the same kind; there is no opportunity, as in the case ordinary farm crops, to correct the tendency to exhaustion by frequent change of crops, or the frequent growth of those whi require different kinds and amounts of plant food constituents.

Nitrogen, Phosphoric Acid, and Potash are the El ments needed in Manures for Orchards. — In studyi methods of manuring orchards, however, it must be admitt that the general principles of manuring which apply to frui apply quite as well to farm crops; that is, the essential co stituents of manures must be the same. A fruit tree will n make normal growth in a soil destitute of nitrogen. That nitr gen encourages leaf growth is a recognized fact, and, since tre grow by means of both leaf and root, its presence is required the soil in order to promote the growth and extend the life the tree. It is very evident, too, that potash is an essential co stituent in the growth of fruits, not only because it constitut a large proportion of the ash of the wood of the apple, pe cherry, and plum, and more than fifty per cent of the ash fruit, but because it forms the base of the well-known fru acids; and in order to nourish a tree properly, as well as insure proper ripening, phosphoric acid is also very essenti though it is apparent from such investigations as have be made that this constituent is relatively of less importance th for the cereals.

It is also a matter of common observation that, in the produ tion of stone fruits particularly, lime is an important constituer Its function seems to be to strengthen the stems and woody po tion of the tree, to shorten the period of growth, and to hast the time of ripening. Fruit trees growing on soils rich in li show a stocky, steady, vigorous growth, and the fruit ripe well, while those on soils which contain but little lime, partic larly the clays, appear to have an extended period of growth, t result of which is, that the wood does not mature and the fru does not ripen properly.

The Need of Manures for Orchards. — It is argued

many, and sometimes by those who should know better, that fruit growing is quite similar to growing trees; that the question of soil exhaustion is not a matter of very great importance, provided the soil is well cultivated, and that all soils contain sufficient quantities of the food elements to insure the relatively small available supply required from year to year.

It is admitted that on soils of good mechanical condition, well drained and cultivated, which are naturally adapted for fruit as well as other crops, because well supplied with the essential constituents, nitrogen, phosphoric acid, potash, and lime, the exhaustion arising from the continuous removal of crops will not become apparent for a long time, but it should be emphasized that it is only upon soils which possess these characteristics that the growth of fruit, even poor fruit, can be continued for any considerable period without the application of manures.

While we have abundant evidence of the need of manures for orchards, derived from our knowledge of the fact that even virgin soils possess, as a rule, a low rather than a high natural strength, and are, therefore, incapable of furnishing for a long time a sufficient amount of one or more constituents, I desire to present further evidence, derived, first, from experiments conducted to determine the relative needs of plant food by certain fruit crops, and second, from such results of actual practice as I have been able to collate.

The only completed experiment in this line is reported by the New Jersey Experiment Station on peaches.[1] This experiment was begun in 1884, and the results fully reported in 1894, though I shall only use the results secured up to 1894.

The object of this field experiment was to study the comparative effect of an annual supply of what was deemed a sufficient quantity of the best forms of the three plant food elements, nitrogen, phosphoric acid, and potash, when used singly and in various combinations; and of large applications of barnyard manure. The experiment included thirteen plots, each one-tenth of an acre in area, and containing thirteen trees. Each of the fertilized plots received an annual application of 150 pounds of nitrate of soda, 350 pounds of bone-black superphosphate, or 150 pounds of muriate of potash per acre, thus furnishing an equivalent of 24

[1] Annual Reports New Jersey Experiment Station, 1884–1894.

pounds of actual nitrogen, or 56 pounds of "available" pho phoric acid, or 75 pounds of actual potash on the three plo which received single elements, and combinations of these amoun of two of the elements on three other plots, and a combin tion of all, or a complete fertilizer, on one plot. In addition, tw plots were not manured; one received land plaster at the rate 100 pounds per acre; one barnyard manure, at the rate of 20 to per acre, and one barnyard manure, at the rate of 10 tons, a lime at the rate of 50 bushels per acre.

Accurate records were kept each year of the health and vig of the trees, and of the yield of the various plots. The soil — clay loam with clay subsoil — was of medium natural fertilit responding readily to manures; its mechanical condition goo and fairly representative of the soil in the peach-growing sectio in New Jersey.

At this point I will give detailed results and comparisons on in case of the plots without manure, with a complete manure, a with barnyard manure.

The average age of an orchard in our State is about eight year during which period three full crops are usually secured. therefore give the average yield in baskets for the average peri of the life of the orchard for the whole period of the experime and for the crop years.

I. — The Yield without Manure.

	Baske per ac
1884–1891, inclusive, 8 years, average per year	65
1884–1893 " 10 " " "	60
1887–1891 " (5 crop years) " "	105
1887–1893 " (7 crop years) " "	86

II. — The Yield with Complete Chemical Manure.

	Baske per ac
1884–1891, inclusive, 8 years, average per year	164
1884–1893 " 10 " " "	183
1887–1891 " (5 crop years) " "	262
1887–1893 " (7 crop years) " "	262

III. — The Yield with Barnyard Manure.

	Baskets per acre.
1884–1891, inclusive, 8 years, average per year	169.5
1884–1893 " 10 " " "	194 7
1887–1891 " (5 crop years) " "	271.3
1887–1893 " (7 crop years) " "	276.8

IV. — The Relative Yield in an Unfavorable Season.

	Baskets per acre.
1889 unmanured	10.9
1889 fertilized	152.5
1889 manured	162.5

The first point of importance and value observed is in reference to the number of crops that were secured. On the unmanured land, the crops secured after eight years were so small as to materially reduce the average for the whole period, while for the manured land the average for the whole period was not only not reduced, but very materially increased; that is, the crops secured on these after the trees on the unmanured land had practically ceased to bear were greater proportionately than those secured previous to that time. This was true both for the fertilized and manured land.

In the next place it is shown that the yield was very materially increased by the use of manures, either in the form of artificial or natural supplies, and the differences in yield derived from these two forms are very slight, indicating that very much smaller amounts of actual plant food in quick acting forms were quite as useful as larger amounts of the less available forms in which the food exists in natural manure products.

For the ten years, the fertilized plot received 250 pounds of nitrogen, 560 pounds of phosphoric acid, and 750 pounds of potash, while the yard manure plot received — assuming the average composition of yard manure — 2,000 pounds of nitrogen, 2,000 pounds of phosphoric acid, and 1,600 pounds of potash; yet with eight times as much nitrogen, nearly four times as much phosphoric acid, and more than twice as much potash, the yield was but 113 baskets greater, or 11 baskets per year. There was no material difference in the size of the trees on the two plots;

in both cases they were large and for the most part he
even when the experiment was concluded, which was not c
by the normal dying of the trees, but by the fact th
larger number of them were partially or wholly destroyed
severe windstorm.

In the third place it is interesting to observe — and it is a
of great importance — the effect of an abundance of food in
coming unfavorable weather or seasonal conditions. The yea
was extremely unfavorable, and the crop throughout the Sta
small. In this experiment the unmanured plot yielded at th
of 10.9 baskets per acre, while the manured and fertilized
both showed a yield exceeding 150 baskets per acre. The m
strengthened and stimulated the trees and enabled them su
fully to resist such conditions as were fatal to the crop c
unmanured land.

This point is one that is seldom considered in calculati
advantages to be derived from proper manuring, though it
extreme value, since the expenses of cultivation, trimming
interest on investment are quite as great in one case as
other.

Another experiment bearing upon this point, recently re
by the Cornell Experiment Station,[1] is also very instructi
indicating the need of manures for fruit trees, not only in
ence to the amount removed, but also in reference to the p
tions of the essential constituents required.

This study shows that the plant food contained in 20 cr
apples, of 15 bushels per tree and 35 trees per acre, and
leaves for the same period, amounts in round numbers to
pounds of nitrogen, 310 pounds of phosphoric acid, and
pounds of potash. These amounts of plant food are com
with the amounts that would be removed by 20 years conti
cropping with wheat, assuming an average yield of 15 b
of wheat per acre, and 7 pounds of straw to 3 bushels of
viz.: 660 pounds of nitrogen, 211 pounds of phosphoric
and 324 pounds of potash. By this comparison it is shown
the 20 crops of apples remove more than twice as much nitr
half as much again of phosphoric acid, and nearly three tin
much potash as the 20 crops of wheat.

[1] Bulletin No. 103, "Soil Depletion in respect to the Care of Fruit Trees."

These results, although only applying strictly to the apple, are valuable in indicating the rate of soil exhaustion by fruit growing. It is to be remembered, however, that the larger root development of the tree would enable it to draw its nourishment from a larger area of soil than is the case with wheat, and thus probably permit of normal growth for a longer period.

THE EXPERIENCE OF PRACTICAL ORCHARDISTS. — The experience of practical fruit growers, particularly if they are successful, is also of value in this connection.

During the past year statistics were gathered in New Jersey concerning the methods of practice in fruit growing, and among the questions asked was, "The kind of manure used and the amounts applied per acre." The results obtained are instructive in showing, first, that orchardists do recognize the necessity of a liberal feeding of their fruit crops; and, second, that the rate of profit, other things being equal, is largely dependent upon such a practice, though the methods in use are widely different, and, in many cases, unsystematic and irrational.

I have selected those gathered in Burlington County, on pears and apples as illustrations, because they furnish good examples of progressive practice, and because those from other counties have not been finally tabulated. Of 169 growers of pears, representing an area of over a thousand acres, 162 use manures of some kind; 54 only barnyard manure, the application ranging from 5 to 15 tons per acre annually; 41 use commercial manures, exclusively, the larger part of which consists of ground bone and muriate of potash, the annual application averaging 600 pounds per acre; 33 use barnyard manure and fertilizers together, an average application of 11 tons of the former and 600 pounds of the latter per acre; 34 use miscellaneous home products, including lime, wood ashes, coal ashes, river mud, muck, etc.; and 7 only of the entire number do not manure at all. Of this whole number, 90 per cent report that fruit is the most profitable crop that they raise, the gross returns ranging from $50 to $600 per acre, with an average of $150.

Of 194 growers of apples, 183 use manure; 82 barnyard manure exclusively, at the rate of nine tons per acre; 30 both barnyard manure and fertilizer, at the rate of nine and one-half tons of the former and 500 pounds of the latter; 29 use fertilizer alone, chiefly bone and potash, at the rate of 700 pounds per acre; 8 use

barnyard manure and lime; and 34 use miscellaneous product
Their average gross returns are about $100 per acre, and pra
tically every grower reports that the crop is a profitable one. W
have here a practical unanimity of opinion as to the necessity
using manures, though a wide difference in practice in referen
to the kind of material used, which is in many cases due to t
relative cost of the various materials, rather than to defini
opinions concerning their relative value.

The Kind of Manure to use. — The kind of manure to use ma
be discussed, first, as to whether it shall be natural or artificia
and, second, if artificial, the kind of materials and the proportio
of the constituents most desirable. In reference to the relati
usefulness of yard manure and the best forms of chemical fertiliz
the data derived from the experiment on peach trees are instru
tive, and I simply add to that already given a financial statemen
showing the relative values of the crops secured, less actual co
of manures, and which does not include the cost of application.

V. — New Value of Crops from Fertilizer and from Natural Manures.

	Per yea
Unmanured, 10 years, value of crop, $301.85	$30 1
Fertilized, 10 years, value of crop, less cost of fertilizer, $810.20	81 0
Manured, 10 years, value of crop, less cost of manure, $673.70	67 3
Annual net increase from fertilizer	51 0
Annual net increase from manure	37 1

As has been already suggested, the amount of yard manur
applied may have been much larger than was necessary, though i
is very clearly shown that the use of chemical fertilizer, under th
conditions obtaining in the experiment, was relatively more profit
able than the manure; hence, while it is hardly safe to conclude
that chemical fertilizers may in all cases be more profitable than
the manure, it was shown in previous tabulations that chemical
fertilizers did practically meet the demands for plant food;
that is, the yield was but little greater from the use of barnyard
manure.

In reference both to the kind of materials and to the proportions

of the constituents most desirable, we have to depend rather upon the opinion of experts than upon well ascertained data, though the Cornell experiment, already quoted, is interesting in that it throws considerable light upon the question of proportion of the various constituents. In this connection I shall quote the opinions of leading horticulturists.

In "Farmers' Bulletin," No. 33, of the Department of Agriculture, on Peach Growing, Erwin F. Smith, the author, under the caption "Fertilizers," says: "Some words are necessary on the use and misuse of fertilizers. Unless the trees are on strong land it will be necessary as soon as they come in bearing, and yearly thereafter, to give them each spring or autumn some special fertilizer. There can be no objection to the use of well composted barnyard manure. Where this is not procurable dependence must be put on clover and commercial fertilizers, taking care always that the latter are obtained from reliable sources. In general the dependence should be on potash salts and phosphates rather than on nitrogenous fertilizers. The peach can be injured readily by excess of nitrogen. Its effect upon the trees is to produce excessive growth of wood and foliage at the expense of the fruit. Fifty to a hundred pounds per acre of nitrate of soda or its equivalent in dried blood or sulphate of ammonia is usually as much nitrogenous fertilizer as any orchard requires, and many orchards do not need it at all. Muriate of potash, kainit, or sulphate of potash may be used in large quantities without injury. Four to five hundred pounds per acre will do no harm, provided it is not put too close to the trunks of the trees."

This opinion is based upon the results of studies to determine the relation of fertility to peach yellows, which were not continued for a long period.

In Bulletin No. 72 of the Cornell Experiment Station, Professor L. H. Bailey says:

"Nitrogen, potassium, and phosphorus are the elements which need to be applied to orchard lands.

"Nitrogen is particularly efficacious in promoting growth. In fact the amount of growth and the color of foliage are reliable guides for the application of nitrogen. Orchards are grown for fruit, not for forestry purposes. In general, it is better to supply nitrogen by good cultivation — which assists nitrification — and

an occasional green manure crop, than by the application nitrogenous fertilizers. If the orchard is not growing and yellowish in foliage, good cultivation — begun early and repea very frequently — in connection with the use of potash, ph phoric acid, and green manures, will commonly correct it.

"Potash is generally the most important element to be appl directly to orchards, particularly after the trees have reac bearing age. The store of available potash in the soil is m increased by the thorough tillage which has already been reco mended, but in bearing orchards it should also be supplied ev year in some commercial form.

"In general, phosphoric acid is rather less important in fr plantations than potash, although this order is reversed in gene farming. Potash should undoubtedly be the leading factor orchard fertilizers, and nitrogen, as I have said, may be obtain mostly by means of tillage and green crops."

Again, in Bulletin No. 74, Professor Bailey says:

"I believe that the keynote to the proper fertilizing of pea orchards is potash and phosphoric acid, and not nitrogen. Ash muriate of potash, bone fertilizers — these are some of t money makers for peach trees. Tillage, with green manure cro at the end of the season, can be relied upon to furnish nitrogen most instances. I do not wish to disparage the use of nitroge for even in bearing orchards a direct application may sometim be necessary; but I desire to state what I believe to be a funda mental consideration in orchard culture, that nitrogen can eas be used to excess and that it can generally be obtained by mea of tillage and green manure, and also that potash and phospho acid need to be annually applied to orchards of bearing age."

The points contained in the above statement are again empl sized by Professor Bailey in Bulletin No. 102. These opinio of Professor Bailey are based largely upon theoretical conside tions, verified by his wide observation.

Professor L. R. Taft, in Bulletin No. 103 of the Michig Experiment Station, says:

"Of the three elements that are often deficient in the so potash, phosphorus, and nitrogen, it can be said that a rich virg soil will generally contain all that is needed for an orchard, b after the trees have matured several crops of fruit, the availab potash and phosphorus is likely to become so reduced that a sat

factory growth cannot be obtained, and if the soil is in any way deficient in organic matter, the amount of nitrogen will probably be rather small. As a rule, a bearing orchard should have, once in two years, from 300 to 500 pounds of ground bone, 200 to 300 pounds of muriate of potash, and 150 pounds of nitrate of soda per acre; or in place of these 25 tons of decomposed stable manure will be beneficial if the soil is light. In addition to their value for supplying plant food, the chemical fertilizers have an additional value, which is, perhaps, equally important, as, by supplying soluble plant food early in the season, they enable trees to make their growth during the first of the season and ripen their wood thoroughly before winter. The growth is, as a rule, much more firm than that obtained by the use of stable manure, or from the natural fertility of the soil. In fact the chemical manures can be used as correctives, since if those containing potash and phosphoric acid are added to soils that have been highly enriched with stable manure, or that are naturally quite rich in organic matter, they will have a tendency to make the new wood more firm and compact. It can then be claimed that the proper use of chemical manures will increase the hardiness of the trees, and will both render the fruit buds less susceptible to sudden changes in the weather, and lessen the danger of their winter-killing."

These statements, while general rather than specific in character, agree in their main points: First, that orchards should be liberally fertilized; second, in giving preference to artificial manures; and third, in urging that great care be exercised in the use of nitrogen. Those in reference both to the unfavorable effect of too much nitrogen, and to the importance of superphosphate and potash salts, are in a measure verified by the New Jersey experiment already quoted, — that is, nitrogen used alone and, therefore, in excess, was not particularly useful, while the combination of phosphoric acid and potash was more serviceable than any other combination of two elements. The nitrogen was, however, of very great value when used in connection with the mineral elements, as the accompanying statement will show.

VI. — Money Value of Crops, Less Cost of Manure.

	Per year.
Unmanured, 10 years, value of crop, $301.85	$30 18
Nitrogen alone, 10 years, value of crop, $307.30 . . .	30 73

	Pe
Phosphoric acid and potash, 10 years, value of crop, $725.65	$7
Nitrogen, phosphoric acid, and potash, 10 years, value of crop, $810.20	8
Annual profit from nitrogen alone	
Annual profit from phosphoric acid and potash	4
Annual profit from nitrogen, phosphoric acid, and potash	5
Annual gain from addition of nitrogen to mineral elements	
Annual gain from application of nitrogen alone	

In this experiment the nitrogen was in the form of nitrat soda, and because of the ready availability of nitrates was do less all absorbed early in the season, and thus did not encou late growth of leaf and branch.

In this experiment, too, a continuous application of exces amounts of organic nitrogen, while probably not of the grea advantage, did not prove detrimental; the wood ripened well the fruit, while maturing a little later in some cases, was quit good as that from trees which received the nitrogen in the f of nitrates.

Suggestions as to the benefits of nitrogenous manuring are furnished by the following examples of actual practice. I these particular examples, because I have full knowledge of facts.

One of the most productive and profitable peach orchard our State is now twelve years old, and at present shows no s of decay or loss of vitality. This orchard, with the exceptio one year, has received annually per acre, since the bearing pe at three years of age:

Nitrate of soda	200
Ground bone	200
Acid phosphate	200
Muriate of potash	200

The exception noted is, that one year the nitrate of soda omitted from part of the orchard; this omission, in the opi of the owner, resulted not only in a considerable loss of fruit that year, but in a diminution of the vitality of the trees, w

was very noticeable in the next crop, even though that year fertilized with nitrates as usual.

This orchard is situated in the peach region on soil well adapted for fruits, and was in a good state of fertility when the trees were planted. Orchards in the immediate neighborhood that were planted at the same time, and which were either not fertilized at all, or in a very unsystematic way, have all been removed, either because of the death of the trees, or because the crops received were not sufficient to pay for the labor of caring for the orchard.

It may be well to state, too, that this orchard, consisting of ten acres, has produced eight profitable crops; one crop returned a net profit of $200 per acre, while the average net profit for the whole period of the life of the orchard, now twelve years, is over $50 per acre.

Another orchard, situated on a sandy loam soil, which had been fertilized liberally with ground bone and muriate of potash only, showed signs of decay at the age of nine years. The spring of the tenth year a part of the orchard received, in addition to the bone and potash, 200 pounds per acre of nitrate of soda, and another part was seeded with crimson clover in the fall of the ninth year, which was used as a green manure crop in the spring of the tenth year. The effect of the added nitrogen was very striking, the trees revived, the color of the leaves changed to a dark green, and the fruit increased considerably, so that now, at the age of thirteen years, this fertilization having been continued in the meantime, it presents a healthy and vigorous appearance.

The third example is furnished by a pear orchard of ten acres, which has not missed a full and profitable crop since it came into bearing, now more than ten years, and is fertilized annually with one-half ton of an even mixture of ground bone and muriate of potash; it received nitrogen in the form of nitrate of soda in the earlier stages of its life, while for the past five years the nitrogen has been supplied through the means of green manures.

The practice of the Burlington County farmers is also in evidence as to the benefits of large and continued applications of nitrogen in the form of barnyard manure, since more than one-third of the whole number represented use this exclusively, while nearly all who use it find the practice profitable. It would seem, therefore, that the advantage of nitrogenous manuring is sufficiently well established, and that the chief questions are as to the

kind of nitrogen and the best methods of use. In the first p the character of the soil must guide here, since soils differ bo their physical and chemical character, and hence in their abili supply food. Sandy soils with sandy or gravelly subsoils r sent a large class; they possess a fairly good physical chara but are very deficient in vegetable matter containing nitrogen, in the mineral constituents, phosphoric acid and potash. On t nitrogen supplied in the form of vegetable matter has prove great advantage, both directly in furnishing nitrogen, and rectly in improving the physical character of the soil, thou must be accompanied by an abundance of the mineral constitu phosphoric acid and potash. If applied in the form of nitrat this class of soils, there is great danger of loss from leaching

Sandy or clay loams overlying clay subsoils of medium por represent another class. These are frequently of good tex and richer in both humus and mineral constituents than the sa With good cultivation fruits make a normal and healthy gro and do not show the need of nitrogen until crops are harves they are then much benefited by it, and it may be most eco ically applied in the form of nitrates, particularly if adde connection with the mineral constituents, phosphoric acid potash.

The third class includes those which possess good phy qualities combined with a high natural strength, which com a relatively small area. Where such soils have not been jected for a long time to exhaustive cropping, the growth development of both tree and fruit proceed normally with m mum applications of manures.

In the second place, the natural mode of growth and deve ment of the tree should guide in the use of nitrogen.

In all cases there should be sufficient nitrogen to provide fo abundant leaf growth early in the season, since the tree and f are dependent for food upon both the leaves and the ro The supply of nitrogen, however, should be limited late in season, or the foliage will hold too long, with a consequent feeding, and the result that the new wood formed will lack ha ness and maturity.

Practical Suggestions. — A system of manuring for cu vated orchards, based upon the limited data at our disposal, n be outlined as follows:

To provide vegetable matter and to improve the physical quality of poor soils, apply yard manure once in four years, in fall or winter, at the rate of from five to ten tons per acre. To aid in the decomposition of vegetable matter, and to insure a sufficiency of lime as plant food, apply lime at the rate of twenty-five bushels per acre once in five years. To provide, in addition, an abundance of all forms of available plant food at the times needed for the development of the tree and fruit, apply annually chemical fertilizers in the following proportions:

Nitrate of soda	100 lbs.
South Carolina rock superphosphate	100 "
Ground bone	200 "
Muriate of potash	200 "

The amounts to be applied depend upon the character of the soils, as previously outlined, the kind of fruit, and the age and vigor of the trees; these given, perhaps, mark the minimum.

In a number of best orchards the quantities applied are very much larger than is here indicated, and the larger application is believed by the growers to be proportionately profitable.

By the recent introduction of crimson clover, we have a plant admirably adapted to supply cheaply nitrogenous vegetable matter for orchards, and its growth is to be recommended wherever the plant can be successfully grown, instead of the use of barn-yard manure, particularly upon the poorer soils, until they are abundantly supplied with vegetable matter. The clover should be ploughed down early in the season, in order not to retard the spring growth of the trees. Where the conditions are favorable for the growth of clover, the application of nitrate of soda may be omitted.

I have in this paper presented, as fully as my time allows, what in my judgment seems to be reliable information bearing upon the subject, and a careful review shows that it only emphasizes the statement made in the beginning, that there is urgent need of studies and investigations concerning the food requirements of the various fruits.

Discussion.

Samuel Hartwell asked, "What is the comparative manuring an orchard with barnyard manure and with fertilizers?"

Professor Voorhees replied that twenty tons of yard ma $1.50 a ton, would cost $30, while the chemical fertilizers su could be bought for $11. In New Jersey commercial fe are relatively cheap and city manures comparatively dear.

Mr. —— Clement said: "The Professor has stated that of a peach tree is eight years. Is not that rather a small nu

Professor Voorhees replied, that it is, but that it is th which orchardists in New Jersey generally remove their o It is a shorter time perhaps than it is here or farther so with our methods, when no manure or fertilizer is used proved the time to stop.

Mr. Clement further asked whether the yellows were to be helped or cured by the use of mineral fertilizers, Professor Voorhees answered, that this point was not mind in the experiments. In some of the orchards wh reported to him as affected, it was found that the appa lows were often caused by a deficiency of food or by louse. When a supply of nitrogen was given the yell usually disappeared and the tree assumed a healthy gr

Being asked, "What proportion of nitrogen should be an application of wood ashes?" Professor Voorhees said would not recommend a mixture of nitrogenous matter a ashes, but rather that the ashes be applied in the fall at of one ton per acre, and that the nitrogen be applied in the form of nitrate of soda; as a rule the application sh exceed one hundred and fifty pounds per acre. An ex give too much leaf growth. Nitrate of soda carries six cent of nitrogen, so that there are twenty-four pounds of in this application of one hundred and fifty pounds of soda. Apply as early as possible, so that it may be in th July. Turn green manure under very early — before Ju the same reason.

Thomas Harrison asked about applying nitrogen ear life of the tree, and whether the amount given and the application should be varied in different years.

In reply Professor Voorhees said that there had been experiments on that point and that an excess of nitrogen gave more leaf and wood growth than was necessary, and the wood had to be cut back. Two hundred pounds of nitrate of soda per year seems to be too much to apply. He would not usually apply nitrogen before the trees begin to bear, but on very poor soils would apply it.

Notice was given of an extra meeting to be held on April 11, when William C. Bates would read a paper on "Mushrooms, Edible and Poisonous."

An invitation was also read from Samuel Henshaw, Secretary of the Boston Society of Natural History, to attend a meeting of that Society, Wednesday evening, April 1, when Professor William Libby would read a paper on "The Hawaiian Islands."

BUSINESS MEETING.

SATURDAY, April 4, 1896.

A duly notified Stated Meeting of the Society was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

Hon. George Heywood, from the Committee to prepare a memorial of the late Hon. John P. Spaulding, presented the following:

MASSACHUSETTS HORTICULTURAL SOCIETY, April 4, 1896.

The Committee appointed to prepare and present resolutions on the death of Hon. John P. Spaulding have attended to that duty and report:

Whereas the Massachusetts Horticultural Society has learned of the sudden decease of one of its members, the Hon. John P. Spaulding, of Boston,

Resolved, That the Society would most reverently recognize the wise though mysterious will of Providence by which it has been so recently deprived of one of its members.

Resolved, That this Society has lost a highly esteemed member, who by his many exhibits manifested a great interest in the

objects, usefulness, and prosperity of the Society; his beaut grounds, filled with the choicest fruits, flowers, and vegetab show that he was an ardent and scientific amateur in horticultu In his death not only has this Society, but the community large and the Commonwealth, city, and country, in many of th interests, lost a most estimable friend and a highly valua citizen.

Resolved, That this Society tenders to his relatives its heartf sympathy in this their deep bereavement.

J. H. Woodford,
George Heywood,
Edwin A. Hall,
Committee.

The memorial was unanimously adopted.

The President read a letter from F. L. Harris, of the Committ to prepare a memorial of the late C. M. Atkinson, stating that t Committee had been unable to perform that duty and aski further time, which was granted.

The President laid before the Society two pamphlets on t diseases of Carnations, presented to the Library.

The following-named persons, having been recommended the Executive Committee for membership in the Society, wer on ballot, duly elected:

William Caleb Loring, of Beverly.
Frank O. Carpenter, of West Roxbury.
Charles Jackson Dawson, of Jamaica Plain.
Mrs. William Farnsworth, of Dedham.

Adjourned to Saturday, May 2.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, April 11, 1896.

A meeting for Lecture and Discussion was holden today at eleve o'clock, the President, Francis H. Appleton, in the chair.

The following paper was read by the author:

Mushrooms, Edible and Poisonous.

By William C. Bates, Vice-President of the Boston Mycological Club, Boston.

The Massachusetts Horticultural Society has now for many years devoted its resources and expert knowledge to the development in this community of a higher intelligence in regard to the growth, propagation, utility, and beauty of all forms of vegetable life — vegetable in its widest sense, including fruit, flower, and plant, and all the products of the vegetable kingdom. The time, intellect, and money of the Society have been devoted to these ends, that the life of man may have a wider, fuller, freer existence, and that his spiritual sense may be quickened by the revelation of the beneficent bounty of the all-mother Nature, and that the stress of man's daily wants may be somewhat lightened by the increased yield in quality and quantity of Nature's products.

It seems eminently proper, in view of this chosen work of the Society, that we should spend the hour in consideration of one form of vegetable life, Native Fungi, which, it is claimed, has within its own field great possibilities of beneficence in its adaptability as nourishing food for man. It has been well said that "he who makes two blades of grass grow where one grew before" is a benefactor of the race; it follows, then, that the revelation to the people of this country that tons upon tons of nutritious diet are spontaneously produced by nature and await each year man's consumption, is the duty of the mycologist and of every one who loves his fellow men.

We will consider the subject, Mushrooms, Edible and Poisonous, almost entirely from an economic point of view — that is, in relation to their value as a food product and in regard to their varieties and abundance in all parts of our country. Botanists have, for about a hundred years, been engaged in analyzing and classifying the fungi until upwards of one thousand species have been ticketed and labeled with scientific names, but it is only within fifty years that much attention has been paid to the esculent qualities of mushrooms, and much progress has been made in very recent years. Indeed, a dozen years ago there were probably not a score of mycophagists in England and America, — that is, persons who knew by their own experience the value of several species of mushrooms for food — eaters of mushrooms.

Mushrooms have been eaten since the earliest times, especially

in early Roman times, and have been used in large quantit
in considerable variety for two or three hundred years in
France, Russia, and Germany. The common people of
and Italy depend upon mushrooms to supply their table at
seasons of the year, and seem to have an intuitive knowle
the edible species, although from ignorance of recent inv
tions mistakes still occur in those countries with fatal
Mushrooms are gathered in the Himalayas and the Vale of
mere, dried, and shipped to Europe; Japan exports large
tities to China; Patagonians have them for an exclusi
during part of the year; in New Zealand and Australia t
sumption is very noticeable, and yet in this country the
mushrooms has been confined to a very limited area, an
within a few years to a single species, and that not one
most conspicuous, or, in the opinion of many mycologis
most valuable, the mushroom of commerce, *Agaricus com*
with its several varieties. The reason of this is not far t
First, this mushroom is almost the only one, so far, whic
itself to artificial propagation, and so has become more ge
known as an edible species than any other; and, second, b
of a wholesome and necessary fear of bad results from
poisonous mushrooms, for it is known to all that some a
injurious if eaten; in point of fact it is probable that eve
there are from twenty to thirty deaths in the United State
this cause alone.

It may be argued from this that if the use of our native
rooms is made more general and popular these fataliti
largely increase, and so instead of a blessing this new food p
will prove a curse. This would undoubtedly be the case unl
knowledge of the poisonous species goes before and follo
surrounds all acquaintance with mushrooms, and this kno
it is the aim of mycologists (and, it seems to me, of this S
to make prominent and foremost in all speech, writing, or
lessons, by exhibition or photograph given upon this subje
is necessary that the student of this subject shall be first
ened to death that he may afterwards rise into peace and
faction and eat his mushrooms without fear and trembling.
can this knowledge be obtained? Is there any rule or gu
which poisonous mushrooms can be known at sight and all
eliminated, so that we may go forth into the fields or woo

gather mushrooms in safety? There is but one way — we must *learn to know them;* that is, we must learn to know at sight certain edible mushrooms, and in the same way learn to know the poisonous species; there is no other way to pluck the flower safety from the nettle danger. This knowledge is not so difficult of acquisition as it seems; it is much easier than it was a few years ago. In recent years upwards of two hundred species of mushrooms have been tested, identified, and branded for all time and for all climates as edible, but perhaps the most notable service in this direction is the running to earth of the archenemy of all, the "deadly Amanita." To this species all the fatal results of mushroom poisoning are traced; it follows that if we can banish this species from our diet comparative safety is assured. It is due to Capt. Julius A. Palmer, Jr., to say that this segregation of the Amanita as the one cause of all mushroom poisoning has been for many years the burden of his speech and writings upon mushrooms; we owe much to him that it is now generally admitted that the Amanita is *the* one particular genus to be avoided, tracing to it most of the fatalities. This has come, too, not only from tracing to this species most of the cases of mushroom poisoning, but from failure to trace such fatalities to other species. This is not to say that all other mushrooms are edible; there are others that will be injurious, and others unfit for food; therefore it remains that those which are edible must also be learned "by heart," as we used to say in school; that is, to be known at sight. It would seem that if we have learned to know the Amanita, half our battle with ignorance is already won, and we are on the road to safety in gathering mushrooms. Let us see what progress we can make in this knowledge today and now.

Before turning to the photographs as aids in identifying the various species of mushrooms both edible and poisonous, let me recall the principal divisions of fungi which are to furnish this abundant food product of the twentieth century. There are the mushrooms with gills, laminæ, or plates, the most abundant and common form being the Agarici, known to all; mushrooms with pores on the under surface, the Boleti and Polyporæ; mushrooms with spines; and the miscellaneous, such as the Puffballs and Coral mushrooms. The Amanita belongs to the first class, the Agarici; it follows therefore that in the other species we are free from its dangers, though we shall have still to learn which of the

Boleti are fit and proper for food, and so with the others. Agarici, or mushrooms with gills, are a large family, and we c part with them all on account of the Amanita, but must lea get rid of it from our collections, leaving us free to gathe great variety of gilled mushrooms which are edible.

This brings us to some consideration of the manner of gr of mushrooms in general and of the Amanita in partic Mushrooms may be considered as the fruit of the plant itself plant being a thread-like substance out of sight below the surf the fruit is nature's method of maturing and distributing the or germ of new life, spores.

Mr. W. Hamilton Gibson, in his recently published work " Edible Mushrooms and Toadstools," has made all who follow on this subject his debtors, and we shall have occasion to c often from his beautiful and life-like plates, as well as Captain Palmer's "Mushrooms of America;" from the Governt reports of the Division of Microscopy, Department of Agricul and the English works of Mrs. T. J. Hussey and Rev. M Cooke.

In a plate of Mr. Gibson's book we see the thread-like pl the mycelium of the mushroom. At times, after rains or in proper conditions of heat and moisture, the growth is quick and these little knobs begin to grow and soon push above surface with the appearance of a small egg. The succes stages of growth are well indicated in another of Mr. Gibs drawings; in the first stage, the mushroom is enclosed i envelope which is soon ruptured, but the envelope or v leaves behind it, in the Amanitas, several indications of presence, and these may well be called Nature's danger sig As the mushroom grows a portion of the ruptured enve adheres to the cap, another portion connects the cap at its with the stem, and another part remains at the base, a cup o from which the stem rises. As the cap expands these scale warts remain upon the cap, the veil falls away from the cap surrounds the stem, the sac remains at the base, and we have complete *Amanita vernus*, a deadly poison, which Mr. Gibson appropriately marked with the death's head and labelled "pois This mushroom is one of the most attractive in appearance, white without distinct odor; it is very common, generally ac panying edible species, and would be likely to be the first sele

by the untrained person. The scales upon the top of the pileus or cap are missing at a later stage of growth, or would be rubbed off by contact; it will be seen therefore that if this mushroom were plucked by cutting above the volva at the base and placed with edible varieties it might give no indication of its deadly character and presence; hence the impossibility of accepting a miscellaneous basket of mushrooms without a certificate of character or an expert knowledge of what is not and cannot possibly be an Amanita. The rule of safety is, all Amanitas grow from a volva or sac, some of this genus are poisonous, therefore gather no mushrooms growing from a volva or sac. If there are scales upon the cap and a veil-like ring and the color is, as we have learned it, pure white, scarlet, orange, or yellow, we should look for the cup, and, as it is not always visible above the ground, pass the knife below the surface, taking care to lift the whole; we shall soon learn to recognize the Amanita family at a distance and keep them there. The *Amanita vernus* is pure white, but *A. muscarius* is orange, yellow, or scarlet, with scales or warts upon the cap, a distinct veil or ring and a volva, although Mr. Gibson notes it as often absent, indicated by a mere ragged line of loose, outward curved, shaggy scales around a bulbous base. Captain Palmer portrays it (the volva) as quite distinct. Probably both are right at different stages of growth. The student should not be content with verbal description, but should turn to the colored plates now available, become familiar with the named varieties as exhibited, — and for that purpose the exhibitions of this Society are invaluable, — and, if possible, when learning to know mushrooms, he should have in the season the practical instruction of an expert friend.

Now let us turn to a pleasanter phase of our subject, and consider some edible species which cannot possibly be mistaken for poisonous varieties. The number of edible species is much larger than is generally supposed; upwards of two hundred have been catalogued, and any mycologist should have an eating acquaintance with from fifty to one hundred kinds. The plate of twelve edible mushrooms from the report of the Agricultural Department for 1894, by Dr. Taylor, may fairly be put before the student as his task for a single season. If he accomplishes this, nature will ever after have a new meaning to him, and he will go forth to the fields and woods with a double and quadruple interest; his eyes will be

opened to new botanical wonders, and he will have a new ap
ation of the bounty of Nature to her foster child, man.

[After these general remarks, the lecturer proceeded to de
carefully some of the leading species of edible mushrooms.
descriptions were made more interesting by the use of stereo
illustrations.]

Agaricus campestris. The Meadow Mushroom. — Ther
many persons who will recognize this mushroom as the on
which they know and gather for food. *Agaricus campestris*
most widely known, and by some thought to be the best
native edible mushrooms. The new mycologist has no enn
this well-known species; he simply claims that it is one
many, and this knowledge is by no means as common as it s
be. It may soon be learned, and ever afterwards be recog
at sight. It grows in open grassy places in fields and pas
but not in the woods. The cap is whitish rather than
brownish rather than brown; the gills beneath the cap, in it
condition, are pink, but soon become a dark brown; the mar
the cap extends a little beyond the extremity of the gills—
over them, we might say. The flesh inclines to turn pink
broken; the stem has a woolly ring or veil. There are many
eties of this species, but none surpassing the *campestris* in fl

Agaricus arvensis. The Horse Mushroom. — This spec
almost as common in the wild state, and more frequently me
I think, in cultivation, as it grows much larger, and so yi
better return in weight. The comparative merits of the *camp*
and several of those we have under consideration today, wi
be settled for a long time. There are two sides to the s
there is room for all in the gastronomic menu. The pe
flavor of the *campestris* has come to be known as *the* mus
flavor, but there are some to whom it is not agreeable, and
say, "Oh, I don't care for mushrooms." As well say, "I
eat meat," because the flavor of mutton is not agreeable.
cophagists claim that there is as much variety in the flav
mushrooms as in those of meats.

Tastes vary; it is said that in Rome the public censor or,
ever may be his title, the official inspector of mushrooms, con
to the Tiber our favorite *Agaricus campestris*, but this may
been changed long ago. It hardly seems possible, for this s
is known and used in Europe, Asia, and Australia. Its popu

is increased, no doubt, by its being so easily recognized when once its characteristics are familiar, but the Common Mushroom is one of many, and we must pass on to other species.

Agaricus gambosus. St. George's Mushroom. — This mushroom will interest us as being due in April; in England it is called St. George's mushroom from the date of its appearance, St. George's Day, April 23. Whether this mushroom appears in this vicinity or not, our interest in the subject is too recent for us to have ascertained. Mr. Gibson speaks of it as common in this country; it is specially noticeable for its rank odor. The cap is from three to six or eight inches in diameter, first convex, then expanding and cracked; the color yellowish white, suggesting soft kid leather; the gills crowded, yellowish white, moist, of various lengths, and joined to the stem by a sharp downward curve; the stem stout and solid. It grows in fields, lawns, and pastures in rings or crescents, much like the Fairy Ring mushroom. Dr. Badham reports collecting from a single ring ten or twelve pounds, and in one field about twenty-five pounds of this mushroom. Farmers, ignorant of the economic value of this crop, take pains to eradicate it, fearing injury to the grass; how much better to take it home in a basket for the table, for themselves and neighbors. This mushroom, coming so early, growing in rings, having white gills, and a powerful odor, could hardly be mistaken for any other. Let us hope some one will report it as found in this vicinity before the end of April of the present season. Dr. Badham recorded: "It is the most savory fungus with which we are acquainted." Cooke gives an appetizing receipt for cooking St. George's mushrooms: "Place some freshly made toast upon a dish, and put the Agarics on it, pepper and salt and put a small piece of butter on each; then pour on each one a tablespoonful of milk or cream, and a single clove to the whole dish. Place an inverted basin over the whole, bake twenty minutes, and serve without removing the cover until it comes to the table, so as to preserve the heat and aroma."

Robinson adds: "A great quantity of gravy comes out of it, mingled in a good specimen with osmazome, which tastes very much like the similar exudation on the surface of a roast leg of mutton."

Agaricus ulmarius. The Elm Mushroom. — This mushroom appears on elm trees, sometimes in dense masses, is edible and

very palatable when young and therefore tender. A large
was observed last summer on an elm tree in the yard belongi
the house of a club near here, whose members would presun
have enjoyed the succulent dish. The manner of growth of
mushroom is sufficient for identification.

Of a similar character is *Agaricus ostreatus*, the Oyster M
room, sometimes called the Vegetable Oyster. It is usually f
in large clusters upon decaying stumps, joined sidewise to
by a short stem. Clusters of several pounds weight ma
gathered from a single stump. The color is dull yellow or
color, the gills dingy white. When young and tender this n
room may be cooked in any way one would cook oysters, and
result will be equally agreeable and nutritious. Mr. Gibson
only seen this mushroom in autumn, but Dr. McIlvaine speak
finding it from March until fall.

Agaricus cretaceus. The Chalk Mushroom. — This is a
white mushroom growing on lawns and rich grass plots — nev
woods. The cap, first globular, afterwards expands, becor
dark and smoky. It is quite brittle and the cuticle peels ea
the stem is hollow and parts easily from the cap without brea
the gills, a strong feature in identification. The flavor is n
One should become acquainted with this species, though it is
so valuable or plentiful as some others that we have discussed

Lepiota procerus. The Parasol Mushroom. — This mushr
is often described by enthusiasts as the best of all. The g
Lepiota is distinguished by a well developed ring, which
breaks loose from its attachment and falls down, or may b
down upon the stem. The cap is distinct from the stem, tha
not joined to it by the gills, the stem being inserted in the
in a distinct cavity or depression of the cap. The parasol h
dry, clean cap three or four inches in diameter with a dis
protuberance in the centre of the top; it is brown in color
has reddish brown scales dispersed somewhat regularly upon
upper surface of the cap. The stem is slender and five or
inches long, swollen at the bottom to a bulb; but witho
sheath or volva. The gills are white; the smell and taste
pleasant and nutty. It grows singly in the open fields, so
times under trees or by the roadside, and is found in summer
early autumn. The flesh is firm and, including the gills, of
form thickness from stem to rim or from centre to circumfere

Two other species, *L. rachodes* and *L. Badhami*, are common in this vicinity, and are both edible. The parasol mushroom is best broiled quickly and seasoned to taste, while the *Badhami* or Saffron Lepiota is better stewed, when it yields a dark rich gravy. The Woolhope Club has recipes for Procerus pie, potted Procerus, Procerus ketchup, Procerus omelet, scalloped Parasol, Parasol sauce, etc.

Coprinus comatus. The Shaggy Mane Mushroom. — This species will always have a special attraction for me, it being the first mushroom which revealed itself to me after my eyes were opened to the possibility of learning to know for myself at least several species of edible fungi. There is no mistaking this mushroom for any other, and, if found in proper condition, that is, not too young or too mature, it would be folly to leave it ungathered. This mushroom has been called "the 'fungus of civilization,' as it is generally found near human dwellings." It seems to thrive on made land, possibly on account of the coal ashes frequently used for filling; consequently we find it on city and suburban lawns or vacant lots; generally on a rich surface of loam, but on new or made ground. It is generally found in clusters, though often springing up singly over a considerable area. Appearing above ground in shape like a pigeon's egg, of a dirty white color, as it develops it becomes elongated and cylindrical, five or six inches in height. The cap does not expand, its shape remaining that of an inverted tumbler; the top is covered with shaggy scales or threads. As the mushroom matures it melts into an inky fluid and sinks into the ground; even when gathered, instead of drying up, if left to itself it deliquesces into a dark slimy mass. In its perfect state the gills are white or of a rosy tinge, soon turning purple and black and so into an inky fluid. This mushroom has good edible qualities; it should be cooked soon after gathering — within twelve hours at least. The flavor is most rich and its texture most delicate when the gills show a pink color, with the margins turning to sepia. There seem to be two seasons to the Coprinus — at least to *C. comatus* — the latter part of May and early in June, and again in September and October, the autumn supply being much the largest. This shaggy mushroom is best cooked, I think, by stewing in milk or cream with butter, pepper, and salt.

Coprinus atramentarius, the Inky Mushroon, *C. micaceus* *C. congregatus*, were also mentioned.

Marasmius oreades. The true Fairy Ring champignon. — is an edible mushroom of such marked characteristics as easily recognized. It flourishes in pastures with short gras the roadside and on lawns; never in the woods. It gro rings, is of a bright buff color, somewhat tough, and with a stem. The gills are wide apart, ten or twelve to the inch, a cream color. All authorities agree that this Fairy Ring r room is of excellent flavor. It may be dried and kept for yea is sold in the London markets, being often picked by the b in England. The size is one or two inches in diameter, when mature, in the centre of the top of the cap is a tiny elev or mound. The gills curve upward and are quite free fro stem. Some mycologists think this the best of all mushr It is the one referred to by Shakspeare in:

> "The nimble elves
> That do by moonshine green sour ringlets make
> Whereof the ewe bites not, whose pastime 'tis
> To make these midnight mushrooms."

The rings in which this mushroom grows widen from ye year and have been observed three hundred feet in diam This is a summer mushroom, extending sometimes into the autumn. Very little care will serve to distinguish the true Ring mushroom from a relative which is not edible, the *Mara urens*, whose gills are crowded together, turning brown, and w stem is more or less covered with down, especially at the The *M. peronatus*, another poisonous champignon, is found in the woods. It has spines at the base of the stalk. These species should be avoided.

The Russulas comprise a large family of edible mushrooms when once learned are easily recognized. They are abunda most parts of the country. They belong to the Agarics, h gills, — most species having even gills, that is, the same le extending from the stem to the edge of the cap. The substan the cap is quite brittle; the stem short and stout, solid, and tap toward the base; no sign of a veil or volva at any stage. The t raw, is sweet and nutty; the color of the cap may be g purple, pinkish gray, and various shades of red; the gills

generally white or pale cream color. There are two special things to be avoided in gathering Russulas; this genus is in special favor with insects, and frequently it seems as if every one was infested in this way. The fastidious will reject all with any appearance of insect occupation, and this may occur between the time of picking and cooking; hence attention must be given to this at the last, just before cooking, by cutting in sections. The other difficulty in gathering Russulas is the danger of picking a noxious species, *Russula emetica*, the effects of which would at least be very disagreeable, and there is at present just one way recommended for detecting the presence of this species, viz., to taste a small piece of each specimen picked. *R. emetica* has an unmistakable hot, peppery taste, and must, of course, be thrown away. The Russulas are so abundant in woods from July to September and of such appetizing flavor when broiled, baked, stewed, or eaten raw, as to be well worth identification.

Lactarius deliciosus. The Orange-Milk Mushroom. — The milky mushrooms are a very common genus in our woods in July and August; they have the characteristic of exuding a milky juice unmistakable when seen. Several of the brown species are edible, and one of the most common, white and with gills very fine and close together, like a fine tooth comb, which is very liberal with its bitter acrid milk, is quite edible, its acridity disappearing in cooking. The most attractive of the milky mushrooms is *Lactarius deliciosus*, the Orange-milk mushroom. The cap is from three to five inches in diameter, and is generally of a dull reddish orange color, with banks or rings of darker red. The flesh, when bruised, exudes a juice of orange color or deep yellow, gradually turning green on exposure. It is found in woods, pine groves, and swamps from July to September. The taste when raw is slightly acrid, but this disappears in cooking. This is considered by all acquainted with it one of the most delicious of our edible mushrooms. I regret that my only summer of search has not brought it to my personal knowledge.

Hypholoma sublateritius. The Brick-Top Mushroom. — While many mushrooms are edible and should be sought after by those desiring additions to the larder, either from necessity or from epicurean motives, there are others which are not important enough to lead us to expect they will become a feature of the markets, owing either to their comparative rarity or lack of decided value.

The *Hypholoma sublateritius*, the Brick-top mushroom, ma
classed in the latter category, though those familiar with its e
qualities will not pass it by. It grows in clusters upon or ar
stumps or on the ground covering decaying wood, and is fou
the late autumn. The cap is of brick red color with paler ed
the gills are at first of a dull white, turning to olive green.
slightly bitter when uncooked, but is excellent when stewed
butter, pepper, and salt and served on toast. It is often f
after frosts, perhaps covered with leaves at the base of a stu

Cantharellus cibarius. The Chantarelle. — If any mushr
deserves the title of Royal it doubtless should be given to
Chantarelle. Nero is said to have declared the *Amanita Cæs*
to be food for the gods. Battara, an old writer on fungi
marked, that "if properly prepared, the Chantarelle would a
the pangs of death." This mushroom is of golden yellow in
its parts, like the dark yolk of an egg. It is about two inche
height and about the same in breadth, conical or funnel shaped.
flesh of the cap is firm and thick; the stem is of the same
stance and equally good to eat. Instead of gills the under sur
is composed of thread-like veins running down the stem,
smaller veins running transversely. The odor is delicate,
ripe apricots or plums; the flesh white, tinged with yellow.
Chantarelle may be stewed, fried, or broiled, combined with
meat of chicken or used in soup; in fact, it can hardly fail to
cite the enthusiasm of the epicure. It grows profusely where
it is found, generally in light woods and partially covered
leaves. My own particular preserve is within four miles of
State House, and the Chantarelle is found there from July to S
tember inclusive. It may be readily dried for use in winter,
when one reflects that within the bounds of New England la
quantities of this delicious mushroom must go to waste every y
utterly unknown and uncared for, it would seem as if a rew
should be offered for its discovery and shipment to market.

There is a false Chantarelle, *C. aurantiacus*, growing in grass
open places; not egg yellow, but reddish orange in color; the g
more like true gills than veins. In another species the gills
almost white, but neither of these would be mistaken for the
Chantarelle by one to whom it had once been familiar.

Boletus edulis. The Edible Pore Mushroom. — The na
Boletus is now applied to those mushrooms which have a soft f

with vertical tubes underneath the cap. The tubes are round or angular; the cap horizontal and fleshy.

The *Boletus edulis* can hardly be mistaken for any other; the surface of the cap is smooth, the flesh white and unchanging; the tubes first white, then pale yellow, and later greenish yellow; the stem solid and quite thick. It is found in spring, summer, and autumn in pine, oak, and chestnut woods. It is sold in quantities in Italy, Germany, and Russia, and is dried for winter use, making an excellent soup. It is usual in England to cut away the porous under surface, using only the fleshy cap, but in young specimens, only two or three inches in diameter, the whole cap, including the pore surface, may be gathered and eaten. These Boleti may be found six or eight inches in diameter; young and smaller specimens are the best; "about the size of a penny bun" is the English standard. They remove the stem and pores, cut the fleshy cap into small pieces, place it in a covered dish with butter, pepper, and salt, and bake for an hour.

There are several species of edible Boleti, and it is noticeable that some which were condemned a few years ago are now known as edible. Such is *B. subtomentosus*, the flesh of which turns blue upon fracture, but there is no longer any doubt of the edibility of the species. Dr. Curtis placed it in his list long ago, and it has been often tried by Captain Palmer and Captain McIlvaine. Some mycologists incline to the opinion that all Boleti are edible if gathered in the proper condition; it is certain that a great number of valuable species are going to waste each year, from lack of attention by our people.

B. alveolatus and *B. felleus* are placed by Gibson among the suspicious Boleti. These may be easily avoided by amateur collectors, *B. alveolatus* having a crimson or a maroon cap, the tube surface the same, and the stem mottled yellow, red, and maroon. *B. felleus* has a pinkish flesh and is extremely bitter to the taste; the tube surface is white to pinkish in color. A sufficient acquaintance with these various Boleti can hardly be made without reference to the colored plates in Mr. Gibson's or Captain Palmers' book.

Strobilomyces strobilaceus. The Cone-like Boletus. — Another edible species which cannot be mistaken for any of the other Boleti, is the Cone-like Boletus. It is of a brownish gray color and has a shaggy surface with brown or black woolly points, the

pore surface grayish white becoming brown, the substance tur
red when broken. It grows to four inches in diameter, and
be dried and kept indefinitely. It its found abundant within a
miles of the State House. Our Italian population have bro
with them a knowledge of Boleti.

Lycoperdeæ or Puffballs. — The puffballs are easily recogn
and cannot be mistaken for species of any other genus. T
are among the most valuable of the edible mushrooms. T
are several species, the most common in this section being *L*
perdon saccatum, with a diameter of three or four inches. It is f
with a soft white flesh when immature and at its edible stage
changes to an elastic yellowish brown, cottony, and dusty m
including the spores, which are soon blown broadcast by
winds. The Giant Puffball, *L. giganteum*, attains a diamete
one and even two feet. This mushroom is cooked by frying
batter of egg and bread crumbs, or it may be stewed with s
other mushroom, of which it will absorb the flavor. Puff
must be gathered young, while they are white and pulpy; if t
ing yellow or powdery they are too old for use. It is the a
dance of this mushroom in many parts of the United States w
gives force to the assertion of mycologists that tons of good
go to waste annually in the United States. Puffballs are fo
from July to September in closely cropped pastures; sometim
meadows and gardens. Dr. Curtis wrote of this fungus: "It
general favorite with me, as it is indeed of all my acquainta
who have tried it. It has not the high aroma of some others,
it has a delicacy of flavor that makes it superior to any omel
have ever eaten. It seems, furthermore, to be so digestible a
adapt itself to the most delicate stomach. It is the South D
of Mushrooms."

Fistulina hepatica. The Beefsteak Mushroom. — This m
room is found on the stumps of oak, ash, and chestnut trees
probably approaches animal food more nearly than any o
fungus. It is interesting to note that this species freque
appears from year to year on the same stump; it is well, theref
"when found to make a note of it." It appears at any time
ing the summer season and grows to a tongue or palm shape,
ing the color of liver or beet, the under side being a pale yel
It is attractive in appearance when in good condition and, a
say, "looks good enough to eat." When young it should

sliced and broiled like steak, or minced and stewed. It lends to the homely hash an ethereal flavor which cannot fail to charm the summer boarder, and it also yields a voluptuous gravy which would have raised the spirits of Mrs. Todgers had she only known of it in her day. It is not a rare mushroom in this vicinity; the open eye will scarcely fail to meet it on any walk through woods abounding in stumps; "it varies in size from a few inches to several feet in circumference. A well-known mycologist, Mr. Bulkley, observed a specimen weighing twenty pounds; it has been called the poor man's fungus." This mushroom is utterly unlike the type ordinarily associated with the name; the under surface is like the Boleti, having pores or tubes closely joined but separating easily, and as small as pin holes. One of the best features is that this species is usually free from larvæ or insects. It projects from the stump without a stem, much as the pod of cocoa grows on its birthplace, and has more the appearance of a shelf.

Morchella esculenta. The Morel. — Another spring mushroom, found in many parts of the country, is the Morel, *Morchella esculenta*. This species differs materially in form from any of the before mentioned types. The whole plant consists of a cap and stem, but is quite different from those of the Agarics, Boleti, or Hydnei. The cap is deeply pitted on the outside with pits or hollows, the flesh being no more than an eighth of an inch thick. The method of bearing spores is unique, but the limitation of our subject will prevent a consideration of that phase. The Morels are all edible and are common in the markets of Paris in June. They are used in a dried state in London, and they should be better known in this country, as they are considered a great delicacy, and certainly grow in Massachusetts. The Morel is found growing in orchards, and is said to thrive in made land where ashes have been used for filling. It appears late in April and until June, and may be dried for later use. The hollow shape suggests a variety of methods for cooking. In Italy they are usually cut in pieces and stewed. Dr. Badham suggests filling the cavities with a stuffing of veal. Let us hope the time will soon come when this appetizing food product will not be left to go to waste. It is said in France that the Morel may be cultivated.

Hydnum repandum. The Hedgehog Mushroom. — This is a spine-bearing mushroom, as the genus Hydnum has spines instead of gills or pores, and so is easily distinguished. As we have shown

there can be no danger of poison in any of this genus. One o most common, *Hydnum repandum*, is found in woods in the aut The cap is irregular in shape, depressed in the centre, and of a yellow; underneath the cap are the spines, crowded and ru downwards, somewhat paler than the cap. The stem is soli first white, then turning a cream color, and is generally quite s Ten or more may be joined together, by which the caps are i ularly formed. The flesh is thick, and the supply is quite p ful in autumn. It may be sliced and dried and so made sui for winter use. This species is in general use in France, Italy Germany, and is well known in England. There can be no d of its value as food, and it is equally certain that there is a supply going to waste in this country from the lack of knowl of its value. Uncooked, this Hydnum has a slightly pungent t and Dr. Cooke recommends its use in a sandwich instead of mus or peppergrass. The Hydnum being dry and inclined to to ness should be cooked slowly. Dr. Badham finds them to rese oysters in flavor. They are called Doeskin mushrooms in Eng and also Hedgehog mushrooms. There are several specie Hydnum, all edible; some grow upon wood; some from ground in woods. One is called *H. coralloides*, and is descr by Professor Peck as being abundant in mountainous districts August to October.

Mr. Gibson describes at length *H. caput-Medusæ*, the Med Head mushroom, and regrets having neglected to gather a bunch through ignorance, only to learn from Dr. Harkness he "had thrown away five pounds of the most delicious fu meat known to epicures."

Polyporus sulphureus. The Sulphurous Polyporus. — Th one of the many pored fungi; its color is a very striking fea and it must have been seen by many of those accustomed to their walks abroad through woods or to drive over shaded ro How many have known it for a choice edible mushroom? It i specified in the English works so far, I believe, but is well kn to American mycologists. It is of a brilliant sulphur-yello orange-salmon color, growing in dense clusters upon a log, stu or fence, — generally upon wood beginning to decay. Mr. Gi speaks of a specimen weighing ten or twenty pounds. A y specimen is delicious and wholesome; the texture varies with and becomes tough and woody at the base. It is easy, howe

to recognize the edible portion and proper condition. Some now present may remember a very fine specimen exhibited on the table of this Society last summer. This was tasted by several members of the Mycological Club with very gratifying results. The flesh may be stewed, fried in butter, or eaten cold as a salad, and on the whole may fairly be said to resemble the white meat of chicken. I am inclined to claim for it equal value as food. It is hardly possible to mistake this edible mushroom for any other, and, if not spoiled in cooking, it cannot fail to recompense whomsoever gathers it. Who shall say how many meals for a family go to waste annually within a stone's throw of some family whose worry would have been lightened by a knowledge of the food value of this mushroom?

Helvella crispa.— This mushroom is also little known in this country. It is allied to the Morel, its spores being enclosed before dissemination. The Helvella is an autumn fungus, and all the species are edible and easily recognized by their fluted hollow stem, flexible waxy cap, and the color — cream above and ochre beneath. It grows in woods during the late summer and autumn.

Armillaria melleus. The Honey Mushroom. — The Honey Mushroom is given in the reports of Dr. Taylor as edible. Cooke speaks of it as the most common and the most universally eaten on the Continent of all the stump mushrooms, and yet it has no favor in England; it is so common in this country as to be rated as a nuisance. All writers have placed this among edible fungi, but in the absence of any personal experience we will not insist upon its value as a food product. It is found growing on stumps, frequently in dense clusters, and if growing out of grass there is a bit of rotten wood beneath; the cap is of a honey-brown color and is about two inches across, darker in the centre than at the outer edge; the stem is rather long, paler than the cap, with a large spreading ring near the top. It is this which gives it the name Armillaria — "little bracelet." The spores are white and so profuse that grass, wood, and leaves beneath are soon covered with a coating of snow-white spores; this feature will help in its identification. More testimony is needed as to the value of this mushroom as a food product, though there is no doubt of its being edible, the question being, Is it esculent? This species is very interesting botanically, though this is somewhat apart from our present subject. Botanists have noted that it gives out a phos-

phorescence or luminosity from the mycelium, and that it is a good illustration of symbiosis, that partnership existence by two organisms live together for a time; the mycelium *Armillaria mellea* entering through the roots of a pine or s permeates the cells of the tree until the fungus is the only surv partner, the tree dying.

A plate in Hartig's "Trees and their Diseases" shows fungus growing from a pine stump, the tree having been kill the association. Authorities differ as to its value as food seems desirable to have this matter further tested by mycolo as it is a prolific species.

Clavaria. Edible Coral Mushrooms. — This genus seems plentiful in all parts of the country, and it is probable that a species are edible, as it is certain the white ones are. Its g resembles coral, and it should be tender and brittle when gath not sodden with moisture or yellow with age. It goes wi saying that mushrooms are fit for food only when in good c tion — that is, before decay has set in and before they are perm with the larvæ of insects, the latter condition occurring very with certain species, especially in the Russulas and Boleti. *varia rugosa* is white, with the tips tinted a greenish gray. *Cla botrytis* may often be found the size of a cauliflower, with tips. The Clavariæ are not to be despised or neglected, th they are not so important a genus of edible mushrooms a many others, and when found in sufficient quantities and in large enough to be gathered free from dirt are absolutely saf eating. Timid people may well begin with the coral mushro They may be dried and used in winter and may be fried in bu stewed like oysters, or eaten raw as a salad. It is not attu by the fungus worms, and is found in summer and autum woods.

These mushrooms now described and photographs of which been thrown upon the screen are the most common of our n edible varieties, and should become familiar to all our people. Massachusetts Horticultural Society will do much to extend useful knowledge of nature's food product by opening its w exhibitions to contributions of mushrooms and by the offe prizes upon special days for collections of named varieties, and course has been adopted for the current year.

In reply to a question, the lecturer said that edible mushrooms in general are distinctly nutritious — much like meat, and should be considered as more than an agreeable delicacy; not merely as a luxury but as food for the poor, whose burden of providing food would be much lightened if this form were utilized.

CONTENTS.

PAGE

PREFATORY NOTE, ... 3

BUSINESS MEETING, January 4, 1896; Address of President Appleton, pp. 5–16; Appropriations for 1896, 16, 17; Appointment of Treasurer and Secretary, 17; Programme of Lectures and Discussions announced, 17; Annual Report of the Secretary and Librarian read, 17; Reports of Committees on Vegetables and School Gardens and Children's Herbariums read, 17; Vote of thanks to Waldo O. Ross, 17; Committee to obtain portrait of retiring President, 17; Finance and Library Committees authorized to store part of the Library, 17, 18; Vote of Thanks to the retiring President, 18; Letter from Hollis Webster, 18; Two members elected, ... 18

MEETING FOR LECTURE AND DISCUSSION, January 11; Hardy Garden Plants, by E. O. Orpet, pp. 18–29; Discussion, ... 29–31

MEETING FOR LECTURE AND DISCUSSION, January 18; Conservatism in Scientific Agriculture, by Prof. W. H. Jordan, pp. 31–47; Discussion, . 47–49

MEETING FOR LECTURE AND DISCUSSION, January 25; Stove Plants in their Native Tropics, by Prof. G. L. Goodale, ... 49–54

BUSINESS MEETING, February 1; Report of Joint Committee on the Building, and vote passed, pp. 54, 55; Annual Report of the Treasurer read, 55; Committee on School Gardens and Children's Herbariums appointed, 55; Committees to prepare memorials of Charles M. Atkinson and Hon. John P. Spaulding, 55; Invitation from Boston Society of Natural History, 55; Member elected, ... 55

MEETING FOR LECTURE AND DISCUSSION, February 8; Seed Control: Its Aims, Methods, and Benefits, by Gilbert H. Hicks, pp. 56–81; Discussion, ... 82, 83

MEETING FOR LECTURE AND DISCUSSION, February 15; Some Scale Insects, by L. O. Howard, with four plates, pp. 84–96; Discussion, . 97, 98

MEETING FOR LECTURE AND DISCUSSION, February 29; Some Tendencies and Problems in the Evolution of Species among Parasitic Fungi, by Prof. George F. Atkinson, pp. 98–118; Discussion, ... 118

BUSINESS MEETING, March 7; Appointment of Secretary *pro tem.*, p. 119; Report of Committee on Gardens referred to Committee on Publication, 119; Six members elected, ... 119

MEETING FOR LECTURE AND DISCUSSION, March 14; Ornamental Planting for Parks and Public Grounds, by William S. Egerton, ... 119–133

MEETING FOR LECTURE AND DISCUSSION, March 21; Grasses, by Prof. F. Lamson-Scribner, pp. 134–149; Discussion, ... 149, 150

MEETING FOR LECTURE AND DISCUSSION, March 28; Manuring Orchards, by Prof. Edward B. Voorhees, pp. 150–165; Discussion, . . . 166, 167

BUSINESS MEETING, April 4; Memorial of Hon. John P. Spaulding, pp. 167, 168; More time granted the Committee on memorial of C. M. Atkinson, 168; Two pamphlets presented to the Society, 168; Four members elected, ... 168

MEETING FOR LECTURE AND DISCUSSION, April 11; Mushrooms, Edible and Poisonous, by William C. Bates, ... 169–187

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1896.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1897.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, May 2, 1896.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

Frederick L. Harris, from the Committee appointed to prepare a memorial of the late Charles M. Atkinson, presented the following report:

Mr. C. M. Atkinson, the subject of this memorial, and for thirty-four years a valued member of the Massachusetts Horticultural Society, was born in Dorchester, England, in 1826, and in early life apprenticed himself to Mr. Campbell, near Exeter, Devonshire; from thence he went to James Veitch's nursery near by, and shortly afterwards assumed charge as foreman at Lord Sefton's, Clevedon. Leaving there he took charge of Pontey's celebrated nursery at Plymouth, Devonshire, where he remained, after marrying, until he decided to emigrate to America. He arrived in New York in 1857, and at once entered the service of Hovey & Co., at Cambridge, whose nursery at that time was celebrated throughout the United States and Europe for its collections of fruits and exotic plants.

Beginning in 1864, he managed the Cushing estate in Belmont three years, when he was appointed Superintendent of Mount Hope Cemetery. Owing to a change of administration there, he took charge of John L. Gardner's estate in Brookline, where he had an opportunity of identifying himself with the best interests of this Society.

As a successful exhibitor he had few equals, and his in
was felt by every one in competition with him. The grand
mens of Azaleas shown by him, six in number, had nev
viously been equalled by any grower; one of them, l
measuring eight feet by six feet. In hardy roses and
wooded plants the numerous medals and diplomas gained
testify to his superior ability. In his death the Society lo
of its efficient aids; for, although considered as belonging
old school of gardeners, he ever maintained a love for eve
introduction, and was ever anxious, by precept and exam
engage others in furthering the objects of the Society.

After a long and active life, his health failing, he resigi
position with Mr. Gardner, January 1, 1895, having held i
period of twenty-seven years. Marrying a second time, he
the winter in Washington and returned to Boston in June
he underwent a surgical operation (the second) and sail
England. After his arrival there, the old trouble soon man
itself, necessitating another operation, which terminated f
His body was brought to Boston and interred in the family
Walnut Hill Cemetery, in Brookline, Thanksgiving Day, 18

We are sure the Society will express its sympathy wi
widow and only son by sending to them a copy of this mem

PATRICK NORTON,
F. L. HARRIS,
KENNETH FINLAYSON, } *Commi*

The memorial was unanimously adopted.

The following named persons, having been recommend
the Executive Committee for membership in the Society
upon ballot duly elected:

LANDER M. BOUVÉ, of Brookline,
HENRY R. STEDMAN, M.D., of Roslindale,
MICHAEL H. WALSH, of Wood's Holl,
GEORGE D. MOORE, of Arlington.

Adjourned to Saturday, June 6.

BUSINESS MEETING.

SATURDAY, June 6, 1896.

This was the day to which the last meeting of the Society adjourned, but no quorum was present, and the

Meeting was dissolved.

BUSINESS MEETING.

SATURDAY, July 11, 1896.

A Stated Meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The decease of M. Léon Say, President of the National Horticultural Society of France, was announced, and the President stated that he had written a letter to the Secretary of the French Society expressive of the appreciation by this Society of the loss sustained.

The Secretary announced the decease of Andrew S. Fuller, of Ridgewood, N. Y., a Corresponding Member of the Society, and one of the most eminent practical horticulturists in the country, as well as the author of valuable horticultural books, and moved the appointment of a committee to prepare a memorial to him. The motion was carried, and the President said that he would announce the Committee later.

The Secretary also laid before the Society a letter from Mrs. C. M. Atkinson, expressing her gratitude for the testimonial to her late husband, and for the sympathy felt by the Society in the loss which his family has sustained.

A vote moved by Joseph H. Woodford, concerning the compensation of Committees, was referred to the Executive Committee.

The following named persons, having been recommended by the Executive Committee, were on ballot elected members of the Society:

GEORGE E. WHITTIER, of Groton,
E. F. SEARLES, of Methuen,
FREDERICK E. CLARKE, of Lawrence,
MISS ELEANOR J. CLARK, of Pomfret, Conn.

Adjourned to Saturday, August 1.

BUSINESS MEETING.

SATURDAY, August 1, 189

An adjourned meeting of the Society was holden at el o'clock, the President, FRANCIS H. APPLETON, in the chair.

Agreeably to the Constitution and By-Laws the President nounced the following Committee to nominate candidates for cers and Standing Committees of the Society for the next yea

WILLIAM H. SPOONER, *Chairman.*

BENJAMIN M. WATSON,	PATRICK NORTON,
SAMUEL HARTWELL,	HENRY W. WILSON,
BENJAMIN P. WARE,	C. MINOT WELD.

Adjourned to Saturday, September 5.

BUSINESS MEETING.

SATURDAY, September 5, 1896

An adjourned meeting of the Society was holden today eleven o'clock. The President and all the Vice-Presidents be absent, the meeting was called to order by the Secretary, and President WILLIAM H. SPOONER was chosen Chairman *pro tem*

Mr. Spooner, as Chairman of the Committee to nominate ca dates for Officers and Standing Committees for the year 18 reported a printed list, which was accepted, and it was voted the Committee be continued and requested to nominate candida in place of any who might decline before the election.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, October 3, 189

A Stated Meeting of the Massachusetts Horticultural Soci being the Annual Meeting for the choice of Officers and Stan Committees, was holden today at eleven o'clock, the Presid FRANCIS H. APPLETON, in the chair.

The Secretary stated that the meeting had been duly notified to the members of the Society, agreeably to the Constitution and By-Laws.

William H. Spooner, Chairman of the Nominating Committee, reported that that Committee had nominated Arthur H. Fewkes as a member of the Committee on Plants, in place of William Robinson, deceased since the last meeting. The report was accepted.

Agreeably to the Constitution and By-Laws, the President appointed Azell C. Bowditch, Hon. Aaron Low, and A. A. Kingman a Committee to receive, assort, and count the votes given, and report the number.

It was voted that the polls remain open two hours. The polls were opened at ten minutes past eleven o'clock.

The President, as Chairman of the Executive Committee, presented the following report:

At the meeting of the Society on the eleventh of July last, the construction of the vote establishing the compensation of Committees was referred to the Executive Committee. Said vote was passed February 14, 1891, and is as follows:

"One hundred dollars to each of the six Chairmen, and one dollar each for other members whenever they attend as required by the Schedule, an account to be kept by the Chairman."

The Executive Committee report that this subject was brought to their attention at their meeting on the 25th of January last, when they adopted the following vote:

"*Voted*, That in the opinion of the Executive Committee, the construction of the rule is that the one hundred dollars covers all remuneration to the Chairmen of those six Committees."

The Executive Committee have now to report that at their last meeting, on the 25th of September, the subject was again carefully considered, and that they saw no reason to change the position taken on the 25th of January.

The report was accepted and adopted.

Joseph H. Woodford objected to the report, and wished his objection recorded. It is as follows:

By vote of the Society at a previous meeting, voted to pay one hundred dollars for the services of the Chairmen of the working

Committees and one dollar for each committee man when
together by the chairmen.

The Executive Committee have decided not to pay certain
bers of the Garden Committee for their services on that Com
and I hereby object to that decision and enter at this ti
protest.

JOSEPH H. WOODF

Michael H. Norton announced the decease of William Rob
and moved that a committee of three be appointed by the
to prepare memorial resolutions. The motion was carried, a
Chair appointed as that Committee Frederick L. Harris, M
H. Norton, and William J. Stewart.

The following named persons, having been recommend
the Executive Committee for membership in the Society,
on ballot duly elected:

CARL BLOMBERG, of North Easton,
HOLLIS WEBSTER, of Cambridge,
JAMES H. DUNLAP, of Nashua, N. H.,
OTIS E. WELD, of Boston,
EDWARD J. MITTON, of Brookline,
MATTHEW S. HIGGINS, of East Bridgewater,
MISS ALICE B. CARY, of Lexington,
ELIHU G. LOOMIS, of Bedford,
WILLIAM S. H. LOTHROP, of Boston,
JEROME JONES, of Brookline,
COL. FREDERICK MASON, of Taunton,
CHARLES H. MOSELEY, of Dorchester,
CHARLES U. COTTING, of Boston,
ABNER J. MOODY, of Boston,
ROLAND W. TOPPAN, of Malden,
FREDERICK STRONG MOSELEY, of West Newbur
HENRY STURGIS GREW, of Boston.

The polls were closed at ten minutes past one o'clock, a
Committee to receive, assort, and count the votes, and rep
number given, reported the whole number of votes cast
seventy, and that the members named in the ticket report
the Nominating Committee had a plurality of votes and
elected.

The report of the Committee was accepted, and the persons named on the above mentioned ticket were, agreeably to the Constitution and By-Laws, declared by the President to have a plurality of votes, and to be elected Officers and Standing Committees of the Society for the year 1897.

Adjourned to Saturday, November 7.

BUSINESS MEETING.

SATURDAY, November 7, 1896.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

O. B. Hadwen, Chairman of a Committee appointed to prepare a memorial of Andrew S. Fuller, of Ridgewood, N. J., made the following report:

IN MEMORY OF ANDREW S. FULLER.

By the death of Andrew S. Fuller, this Society has lost one of its most valued Corresponding Members, and horticulturists a brother who has devoted a long life to the advancement of both the science and the practice of their art. He was an enthusiast in promoting the cultivation of fruits; and his published works were among the first containing elaborate experimental information relating to the propagation and cultivation of that extensive class commonly known as small fruits, and are justly recognized by the large class of growers engaged in that branch of horticulture as standard works. He has been the means of stimulating the vast cultivation pursued all over our country, and of elevating the industry to its present advanced standard.

Mr. Fuller's work, "The Forest Tree Culturist," is a most valuable acquisition to this branch of agricultural industry, at present in its infancy, but destined, as time goes on, to improve a vast area of land now comparatively worthless. This work has awakened a more general interest, which slowly but surely will benefit the whole country as well as those who are immediately engaged therein. Those of the Society who have personally known Mr. Fuller, and have seen him at the meetings of the American Pomological Society, when being held in Boston and

other cities, remember him as a gentleman of fine and cult
personality, charming in conversation and anecdote, and al
ing in those gentlemanly qualities, gained during a long life
his trees, fruits, and flowers, which rendered him preëmine
benefactor to the horticultural age in which he lived.

Though he has passed away, his works are still with
impart practical knowledge not only to the present generat
men, but to generations to come. We mourn his loss no
as a Corresponding Member of this Society, but as an exper
and valued contributor to the advancement of the science a
of Horticulture. His manifold ability and industry have
him well in the lead of writers on horticultural subjects; a
wide circulation of his books has made him justly renc
He impressed one as a man who thoroughly understood a
joyed horticultural life; he was noted for his fondness for
trees and plants to his friends, and for his readiness ever to
a helping hand to all striving to advance in horticultural pu

Mr. Fuller was elected a Corresponding Member of this S
in 1869. His memorial is found in our Library not only
own works, which he sent to it as they appeared, but in a c
Gerard's "Herbal" presented by him.

O. B. Hadwen,
J. Woodward Manning,
Robert Manning, } *Commi*

The memorial was unanimously adopted, and it was o
that it be entered on the records, and that a copy be sent
family of Mr. Fuller.

William J. Stewart, from the Committee to prepare a me
of the late William Robinson, presented the following repor

William Robinson came to this country in 1877, at the
twenty-six, already favorably known for his skill in the
branches of gardening, and at once assumed charge of the
houses and grounds of the late Frederick L. Ames. Un
management the collection of rare Orchids in this place so
came well known, and at the time of his death, on the 1
September, 1896, it had attained the distinction of being th
extensive and valuable collection of the kind in America.

From the first, Mr. Robinson manifested a lively interest in local horticultural matters. In the meetings and exhibitions of the Massachusetts Horticultural Society he found congenial surroundings. Ambitious, energetic, and impetuously enthusiastic, he quickly became influential among his brother gardeners, arousing life and activity in those with whom he came in contact, commanding from all that respect to which he was entitled as a leader and expert in his profession, and from many of us a deep and tender appreciation of his sterling manly qualities, his generous, sympathetic nature, and his fidelity to every trust reposed in him.

He became a member of this Society in October, 1883, but had already won many honors as a contributor to our exhibitions. The records of the Society show him to have won many Silver Medals and Certificates not only for Orchids, but for superior skill in the cultivation of difficult Stove Plants and Ferns. Many of the rarer Orchids, such as *Phalænopsis grandiflora aurea* and *Cypripedium insigne Sanderæ*, were bloomed by him for the first time in America, the latter having won the highest possible award, the Gold Medal of the Massachusetts Horticultural Society. Many beautiful seedling Masdevallias, Cypripediums, and Cattleyas also attest his skill. For the last five years he had been a member of the Plant Committee.

We, therefore, do hereby record our recognition of his inestimable services in the cause of horticulture; of the honor and prestige which he was instrumental in bringing to this Horticultural Society; of his worth as a citizen and his manliness of character, gratefully yet sadly adding his name to the lengthening list of those who, having each in his allotted sphere endeavored to perform faithfully his whole duty, now rest from their earthly labors.

Respectfully submitted by the Committee,

FREDERICK L. HARRIS,
MICHAEL H. NORTON,
WILLIAM J. STEWART,
Committee.

This memorial also was unanimously adopted, and it was voted that it be entered on the records, and that a copy be sent to the family of Mr. Robinson.

The President, as Chairman of the Executive Committee, re-

'ported a recommendation that the Society make the follo
appropriations for the year 1897, viz.:

For Prizes and Gratuities:

For Plants	$2
" Flowers	2
" Fruits	1
" Vegetables	1
" Gardens	
Total for Prizes and Gratuities for the year 1897 .	$8

These amounts are the same as those for the year 1896, ex
that for Vegetables, to which $50 is added.

The Executive Committee also recommended the follo
appropriations, all being the same as those for 1896:

For the Committee on Lectures and Publications, this sum to include the income of $50 from the John Lewis Russell Fund . . . . . $

For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee . .

For the Library Committee, for the purchase of Magazines and Newspapers, Binding of Books, and Incidental Expenses of said Committee . . . . . .

For the Committee on School Gardens and Children's Herbariums, this sum to cover all Incidental Expenses of said Committee and to be paid through the usual channels . . . . . .

This report was accepted, and, agreeably to the Constitution
By-Laws, was laid over for final action on the first Saturd
January next.

The Executive Committee also reported a recommendation
the Society request the Vegetable Committee to exercise strict
in the exhibitions of Fungi, with special reference to those lab
" Edible."

This recommendation was adopted.

William J. Stewart presented the following vote:

Voted, That the Vegetable Committee be requested to pro
exhibition cards, distinctly colored (red or otherwise) and ha

the word "Poisonous" plainly printed thereon, and that exhibitors of Fungi not known to be edible be required to use these cards in labelling all such exhibits when shown in Horticultural Hall.

This vote was passed in the affirmative.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

Hon. Charles F. Sprague, of Brookline,
George E. Stone, Professor of Botany in the Massachusetts Agricultural College, Amherst.

Adjourned to Saturday, December 5.

BUSINESS MEETING.

Saturday, December 5, 1896.

An adjourned meeting of the Society was holden at eleven o'clock, the President, Francis H. Appleton, in the chair.

The Annual Report of the Committee of Arrangements was read by Joseph H. Woodford, Chairman, accepted, and referred to the Committee on Publication.

John G. Barker, Chairman of the Committee on Gardens, made a partial report from that Committee, being the awards of Prizes and Gratuities for the year, for which, he stated, there had been more competition than in most years. This report was also accepted and ordered to be placed on file.

The Annual Report of the Library Committee was read by William. E. Endicott, Chairman, accepted, and referred to the Committee on Publication.

William J. Stewart, Chairman of the Committee on Establishing Prizes, presented the Schedule of Prizes for 1897, and explained the most important changes in the Rules and Regulations, and also in the offer of Prizes. This report was accepted, with the provision that a vote of the Society concerning special prizes offered by individuals be complied with, and that it then be printed as the Schedule of Prizes for the year 1897.

J. Woodward Manning, Chairman of the Committee on Flowers, stated that the Annual Report of that Committee was ready, but

that he was unable to bring it with him, and would read it
next meeting.

The Secretary announced the death of Samuel G. Damon
it was voted that a committee of three be appointed by the
to prepare a memorial. The Chair appointed as that Com
Benjamin G. Smith, E. W. Wood, and Charles F. Curtis.

The President read the draft of a letter to the President
of the United States, concerning the appointment of the Sec
of Agriculture. It was unanimously voted that the lett
adopted as an expression of the views of the Society, and
the President be authorized to transmit it to the President-el
the United States.

The following named persons, having been recommended b
Executive Committee for membership in the Society, were on
lot duly elected:

Hon. John Simpkins, of Yarmouthport,
B. Preston Clark, of Cohasset,
William V. Kellen, of Marion,
John G. Wright, of Brookline,
Miss Sarah L. Arnold, of Newton Centre,
James C. Scorgie, of Cambridge,
John W. Clark, of North Hadley.

Adjourned to Saturday, December 12.

BUSINESS MEETING.

Saturday, December 12, 18

An adjourned meeting of the Society was holden at e
o'clock. The President and Vice-Presidents being absent
meeting was called to order by the Secretary, and Pa
Norton was chosen Chairman *pro tem.*

The Annual Report of the Committee on Fruits was read b
W. Wood, Chairman, accepted, and referred to the Committe
Publication.

The Annual Report of the Committee on Plants was prese
by Azell C. Bowditch, Chairman, but as he was suffering fr

severe cold he was excused from reading it, and it was referred to the Committee on Publication.

J. Woodward Manning presented his report as Chairman of the Committee on Flowers.

John G. Barker presented his report as Chairman of the Committee on Gardens.

A portion of each of these reports was read, and they were then severally referred to the Committee on Publication.

Robert Manning read his Annual Report as Secretary and Librarian, which was accepted and referred to the Committee on Publication.

The following vote, moved by Joseph H. Woodford, was passed:

Voted, That the President instruct the Treasurer to pay all warrants issued or to be issued by the Chairmen of the various Committees to all persons serving on a Committee, irrespective of whether they are Chairmen of other Committees or not.

Henry L. Clapp, Chairman of the Committee on School Gardens and Children's Herbariums, read the Annual Report of that Committee, which was accepted and referred to the Committee on Publication.

The meeting was then dissolved.

REPORT

OF THE

COMMITTEE ON PLANTS

FOR THE YEAR 1896.

By AZELL C. BOWDITCH, CHAIRMAN.

The exhibitions for the past year have shown a marked im
ment, both in the number of exhibitors and also in the ski
care bestowed on the cultivation of the plants shown.

The capacity of our halls has been severely taxed at our
shows, your Committee being obliged to crowd the large
tions to an extent which greatly injured the effect of many
collections and specimens exhibited; but as this matter is in
petent hands we trust in the near future to find ourselves in
commodious quarters.

Your Committee take this opportunity to mention some
most worthy exhibits during the season:

The first exhibition was held on the 11th of January,
William Thatcher and D. F. Roy showed some fine plants
improved strain of Chinese Primrose.

On the 1st of February Robert Cameron (gardener at the B
Garden of Harvard University) exhibited a fine plant of *A*
cum sesquipedale with twenty-five flowers, which was the a
tion of everyone.

SPRING EXHIBITION.

MARCH 24, 25, 26, AND 27.

During this exhibition the weather was extremely cold,
deterred the orchid growers, whose displays have added so
to these occasions in the past, from bringing in their plants, a

absence of Cinerarias was also noticeable. Yet, with all these drawbacks, the show was pronounced to be the finest yet given by the Society at this time of the year. First and best were the Cyclamens, of which there were nearly two hundred pots shown. Mrs. Benjamin P. Cheney (John Barr, gardener) had about seventy-five plants, on several of which were blooms measuring five inches from tip to tip; this lot was awarded the first prize. A close competitor was Nathaniel T. Kidder (William J. Martin, gardener), who was awarded the second prize. Undoubtedly a great attraction was Jackson Dawson's Crimson Rambler Rose; to describe the beauty of this plant, with its thousands of brilliant flowers, would be almost impossible; some of the trusses carried as many as forty flowers and buds. Your Committee deemed this a great acquisition, and awarded Mr. Dawson the Society Silver Medal.

MAY EXHIBITION.

May 2.

This brought a fine display of Calceolarias, Mrs. Benjamin P. Cheney staging twenty-six plants, all well flowered. Elisha S. Converse's plants showed quite a novel range of color; the individual blooms were of enormous size, and the foliage was very fine. Nathaniel T. Kidder had on exhibition a plant of *Bougainvillæa Sanderiana* fully six feet through, for which a Silver Medal was awarded. A fine specimen of *Boronia elatior*, fully six feet high, from the conservatories of Dr. C. G. Weld (Kenneth Finlayson, gardener), attracted a great deal of attention.

ROSE AND STRAWBERRY EXHIBITION.

June 23 and 24.

This brought a magnificent display of Orchids from the conservatories of E. V. R. Thayer (E. O. Orpet, gardener). Seldom do we see such well grown and well flowered Cattleyas and Odontoglossums. John L. Gardner (W. Thatcher, gardener) was represented by a fine group, and also W. P. Winsor (P. Murray, gardener), a new contributor. Nathaniel T. Kidder also exhibited a plant of *Schomburgkia tibicinis*, the gay-colored flowers of which attracted much attention.

August 15 we had from the Botanic Garden of Harva
versity (Robert Cameron, gardener) a new greenhouse
Angelonia angustifolia, from seed gathered in New M
the flowers are a light violet blue, and are borne in the axil
leaves, the plants being small. Your Committee thoug
another season and further development would enable t
judge better of its value. For the present they give it Ho
Mention.

ANNUAL EXHIBITION OF PLANTS AND FLO

September 2 and 3.

At this exhibition J. W. Manning made an exhibit of
Coniferous Trees, among them being some new and rare va
which made quite an attractive display at the entrance to th
George A. Nickerson and Jason S. Bailey exhibited fine
tions of greenhouse plants, which showed what good care
thorough knowledge can do; their displays were, in the opi
your Committee, among the best ever made.

September 19 J. W. Manning exhibited some plants
new *Caryopteris Mastacanthus* (Blue Spiræa); it is pe
hardy; flowers blue, borne in clusters at the axils of the
making a hardy shrub which must be a great acquisition;
awarded the Society's Silver Medal.

CHRYSANTHEMUM EXHIBITION.

November 10, 11, 12, and 13.

November 10 ushered in the Chrysanthemum Exhi
which was without doubt the finest ever staged in Americ
average high quality of the exhibit was remarkable. Th
principal exhibitors for the twelves were: Nathaniel T.
(William J. Martin, gardener), Walter Hunnewell (T. D. H
gardener), and Mrs. Benjamin P. Cheney (John Barr, gard
They took prizes in the order named. Mr. Kidder's exce
general effect; his plants were very even, and the foliag
excellent. Mr. Hunnewell's were not so regular; but two o
W. H. Lincoln and Garza, were certainly the two finest spe
that ever entered the hall. Mrs. Cheney's plants were

models, regular and dwarf, but suffered in general effect. The groups in the centre of the hall, arranged for general effect with palms and foliage plants, gave the competitors a chance to show their taste and skill in the arrangement, and quite put your Committee on their mettle before they could come to a decision.

Amount appropriated for 1896		$2,000 00
Amount awarded in Prizes and Gratuities	$1,921 00	
Balance unexpended	79 00	
		2,000 00

All of which is respectfully submitted.

A. C. Bowditch,
James Comley,
James Wheeler,
} *Committee.*

PRIZES AND GRATUITIES AWARDED FOR PI
1896.

January 11.

Chinese Primroses. — Six plants, in six-inch pots, John L. Gardner
Second, Elisha S. Converse . . . . . .
Third, John L. Gardner . . . . . .

Gratuity: —
Walter Hunnewell (T. D. Hatfield, gardener), Lachenalias . .

February 1.

Freesias. — Six pots, the second prize to the Bussey Institution .

Gratuities: —
David Nevins, Twelve Violets in ten-inch pots . . . . .
Botanic Garden of Harvard University, Collection of Freesias and Strobilanthes . . . . . .
Walter E. Coburn, Twelve Chinese Primroses . . . . .
Richard T. Lombard, Violets . . . . . .

February 8.

Gratuities: —
James Comley, Epacris . . . . . .
Botanic Garden of Harvard University, *Platyclinis glumacea* .

February 15.

Gratuity: —
Walter Hunnewell, Impatiens, Begonias, and Coleus . . .

February 29.

Gratuity: —
James Comley, Cypripedium . . . . . .

SPRING EXHIBITION.

March 24, 25, 26, and 27.

Theodore Lyman Fund.

Indian Azaleas. — Six distinct named varieties in pots, Bussey Institution . . . . . .
Second, James Comley . . . . . .

Society's Prizes.

Indian Azaleas. — Four distinct varieties in not exceeding ten-inch pots, Bussey Institution . . . . . .
Second, Bussey Institution . . . . . .

Two distinct named varieties, Dr. C. G. Weld	6 00
Second, Bussey Institution	4 00
Specimen plant, named, Norton Brothers	8 00
Second, Bussey Institution	6 00
Single plant of any named variety, in not exceeding an eight-inch pot, Dr. C. G. Weld	5 00
Second, Bussey Institution	4 00
ERICAS. — Six, not less than three species, Bussey Institution	6 00
HARDY ORCHIDS. — Collection in pans or pots, forced, Bussey Institution	2 00
Second, Bussey Institution	1 00
STOVE OR GREENHOUSE PLANTS. — Specimen in bloom, other than Azalea or Orchid, Dr. C. G. Weld	8 00
Second, Elisha S. Converse	6 00
HARD-WOODED GREENHOUSE PLANTS. — Four in bloom, Dr. C. G. Weld	10 00
HYBRID PERPETUAL ROSES. — Forced, six plants in pots, not less than three distinct varieties, James Comley	5 00
Second, James Comley	4 00
FORCED HARDY HERBACEOUS PLANTS AND SHRUBS. — The second prize to the Bussey Institution	15 00
HARDY FLOWERING DECIDUOUS SHRUBS, FORCED. — Four, of four distinct species, Bussey Institution	8 00
Second, Bussey Institution	6 00
Third, Bussey Institution	4 00
HARDY FLOWERING EVERGREEN SHRUBS, FORCED. — Four, of four distinct species, Bussey Institution	8 00
HARDY PRIMROSES AND POLYANTHUSES. — Twelve plants of distinct varieties, John L. Gardner	8 00
Second, Dr. C. G. Weld	6 00
Third, David Nevins	4 00
AURICULAS. — Six, in pots, Dr. C. G. Weld	8 00
CYCLAMENS. — Ten plants in bloom, Mrs. Benjamin P. Cheney	15 00
Second, Nathaniel T. Kidder	12 00
Third, Mrs. B. P. Cheney	10 00
Fourth, Mrs. B. P. Cheney	8 00
Ten plants in bloom, in not over seven-inch pots, Mrs. Benjamin P. Cheney	8 00
Second, Mrs. Benjamin P. Cheney	6 00
Third, Nathaniel T. Kidder	4 00
Single plant in bloom, Nathaniel T. Kidder	5 00
Second, David Nevins	4 00
CINERARIAS. — Six varieties, John L. Gardner	10 00
Second, Mrs. Benjamin P. Cheney	8 00
Third, Jason S. Bailey	6 00
Fourth, Bussey Institution	4 00

Three varieties, Mrs. Benjamin P. Cheney . . . . . .
Second, John L. Gardner . . . . . .
Third, Elisha S. Converse . . . . . .
Single plant, John L. Gardner . . . . . .
Second, Mrs. Benjamin P. Cheney . . . . . .
Third, Elisha S. Converse . . . . . .

Spring Flowering Bulbs.

HYACINTHS. — Twelve distinct named varieties, in pots, one in each pot, John L. Gardner . . . . . .
Second, Bussey Institution . . . . . .
Third, Dr. C. G. Weld . . . . . .
Six distinct named varieties, in pots, one in each pot, Dr. C. G. Weld . . . . . .
Second, Elisha S. Converse . . . . . .
Third, Bussey Institution . . . . . .
Three distinct named varieties, in pots, one in each pot, Dr. C. G. Weld . . . . . .
Second, Elisha S. Converse . . . . . .
Third, Bussey Institution . . . . . .
Single named bulb, in pot, Miss Mary S. Walker . . . . .
Second, Dr. C. G. Weld . . . . . .
Three pans, not to exceed twelve inches, twelve bulbs of one variety in each pan, Miss M. S. Walker . . . . . .
Second, Dr. C. G. Weld . . . . . .
Third, John L. Gardner . . . . . .
Two pans, not to exceed twelve inches, ten bulbs of one variety in each pan, Elisha S. Converse . . . . . .
Second, Bussey Institution . . . . . .
Third, Miss M. S. Walker . . . . . .
Single pan, not to exceed ten inches, ten bulbs of one variety, Bussey Institution . . . . . .
Second, Miss M. S. Walker . . . . . .
Third, Elisha S. Converse . . . . . .
TULIPS. — Six eight-inch pans, nine bulbs of one variety in each, Warren Ewell & Son . . . . . .
Three eight-inch pans, nine bulbs of one variety in each, Warren Ewell & Son . . . . . .
Three ten-inch pans, twelve bulbs of one variety in each, Miss M. S. Walker . . . . . .
Second, Warren Ewell & Son . . . . . .
POLYANTHUS NARCISSUS. — Four seven-inch pots, three bulbs in each, distinct varieties, Dr. C. G. Weld . . . . . .
JONQUILS. — Six six-inch pots or pans, the number of bulbs in each to be at the discretion of the grower, Bussey Institution .
Second, Dr. C. G. Weld . . . . . .
Third, Warren Ewell & Son . . . . . .

NARCISSUSES. — Six eight-inch pans, distinct varieties, single or double, Warren Ewell & Son 5 00
Second, Bussey Institution 4 00
Three eight-inch pans, Warren Ewell & Son 4 00
Second, Bussey Institution 3 00
LILIUM HARRISII. — Six pots, not exceeding ten inches, Elisha S. Converse 8 00
Second, Mrs. Benjamin P. Cheney 6 00
LILY OF THE VALLEY. — Six six-inch pots, Bussey Institution . 4 00
Second, Warren Ewell & Son 3 00
Third, Warren Ewell & Son 2 00
ANEMONES. — Three pots or pans, Bussey Institution . . . 4 00
FREESIAS. — Six pots or pans, Bussey Institution 4 00
Second, Dr. C. G. Weld 3 00
Third, John L. Gardner 2 00
IXIAS AND TRITONIAS — Six pots or pans, in varieties, Dr. C. G. Weld 4 00
Second, Dr. C. G. Weld 3 00
ROMAN HYACINTHS. — Six eight-inch pans, ten bulbs in each, Warren Ewell & Son 4 00
GENERAL DISPLAY OF SPRING BULBS. — All classes, Bussey Institution 15 00
Warren Ewell & Son 12 00

Gratuities: —

H. H. Rogers, Cyclamen and Cinerarias 7 00
Dr. C. G. Weld, *Acacia pubescens* 6 00
Edward Butler, Dendrobium 5 00
Mrs. Benjamin P. Cheney, Display of Cyclamens 5 00
James Comley, Forced Roses 5 00
David Nevins, Display of Violets 4 00
Dr. C. G. Weld, Display 5 00
James Comley, Display 5 00

APRIL 11.

Gratuities: —

James Comley, Display of Azaleas 5 00
Edward Butler, " " Orchids 4 00

APRIL 18.

Gratuity: —

Fred W. Fletcher, *Justicia carnea* 1 00

APRIL 25.

Gratuity: —

James Comley, Seedling Azalea 2 00

MAY EXHIBITION.

May 2.

Pelargoniums. — Six named Show or Fancy varieties, in not less than eight-inch pots, in bloom, Nathaniel T. Kidder . .
Indian Azaleas. — Six plants, in pots, named, Dr. C. G. Weld .
Second, Dr. C. G. Weld . . . . . .
Single specimen, Dr. C. G. Weld . . . . . .
Second, James Comley . . . . . .
Calceolarias. — Six varieties, in pots, Mrs. Benjamin P. Cheney .
Second, Elisha S. Converse . . . . . .
Third, Mrs. Benjamin P. Cheney . . . . . .
Fourth, Mrs. Benjamin P. Cheney . . . . . .
Single plant, Mrs. Benjamin P. Cheney . . . . . .
Second, Mrs. Benjamin P. Cheney . . . . . .
Streptocarpus. — Six pots, Dr. C. G. Weld . . . . . .
Second, Dr. C. G. Weld . . . . . .

Gratuities: —
Dr. C. G. Weld, Display of *Boronia elatior* . . . . . .
Dr. C. G. Weld, Display . . . . . .

June 4.

Gratuities: —
John L. Gardner, Collection of Orchids . . . . . .
Oakes Ames, *Dendrobium thyrsiflorum* . . . . . .

ROSE AND STRAWBERRY SHOW.

June 23 and 24.

Hard-wooded Greenhouse Plants. — Three, of three distinct named varieties, in bloom, John L. Gardner . . . .
Orchids. — Six plants, of six named varieties, in bloom, E. V. R. Thayer . . . . . .
Second, John L. Gardner . . . . . .
Three plants, of three named varieties, in bloom, John L. Gardner . . . . . .
Second, E. V. R. Thayer . . . . . .
Single specimen, named, E. V. R. Thayer . . . . . .
Second, John L. Gardner . . . . . .
Tuberous Begonias. — Six pots, of six varieties, Dr. C. G. Weld,

Gratuities: —
W. P. Winsor, Collection of Orchids . . . . . .
Norton Brothers, Palms . . . . . .

JULY 18.

ACHIMENES. — Six, in not over eight-inch pans or pots, of six varieties, Dr. C. G. Weld 5 00

AUGUST 1.

Gratuity : —

Bussey Institution, Display of Hydrangeas 8 00

AUGUST 8.

Gratuities : —

James E. Rothwell, Display of Orchids 4 00

Mrs. P. D. Richards, Plants 2 00

ANNUAL EXHIBITION.

SEPTEMBER 2 AND 3.

HARDY CONIFEROUS TREES. — Not Natives of New England, Display in pots and tubs, named, J. W. Manning 25 00

PALMS. — Pair, in pots or tubs not more than twenty-four inches in diameter, Dr. C. G. Weld 12 00

Second, J. W. Howard 8 00

Pair, in pots not more than fourteen inches in diameter, John L. Gardner 8 00

Second, J. W. Howard 6 00

GREENHOUSE PLANTS. — Collection, containing Foliage Plants of all descriptions, not to exceed forty plants, in pots or tubs, George A. Nickerson 40 00

Second, Jason S. Bailey 30 00

Six Greenhouse or Stove Plants, of different named varieties, two Crotons admissible, Nathaniel T. Kidder 25 00

Second, John L. Gardner 20 00

Third, Dr. C. G. Weld 15 00

Single plant for table decoration, in a twelve-inch pan or basket, dressed at the base with living plants only, only one entry admissible, George A. Nickerson 8 00

Second, Elisha S. Converse 6 00

Third, John Jeffries 4 00

SPECIMEN FLOWERING PLANT. — Single named variety, Joseph H. White 8 00

Second, Joseph H. White 6 00

FUCHSIAS. — Six, in not over ten-inch pots, Joseph H. White . . 12 00

Second, Nathaniel T. Kidder 10 00

ORNAMENTAL LEAVED PLANTS. — Six named varieties, Crotons and Dracænas not admissible, Dr. C. G. Weld 15 00

Second, Joseph H. White 12 00

Third, John L. Gardner 10 00

Single specimen, variegated, named, not offered in any collection, George A. Nickerson . . . . . .
Second, Nathaniel T. Kidder . . . . . .
Third, Joseph H. White . . . . . .
CALADIUMS. — Six named varieties, Dr. C. G. Weld . . .
Second, Nathaniel T. Kidder . . . . . .
FERNS. — Six named varieties, no Adiantums admissible, Joseph H. White . . . . . .
Second, Dr. C. G. Weld . . . . . .
Specimen, other than Tree Fern, Elisha S. Converse . . .
Second, George A. Nickerson . . . . . .
TREE FERN. — Single specimen, named, not less than six feet in height, George A. Nickerson . . . . . .
Second, John L. Gardner . . . . . .
ADIANTUMS. — Five named varieties, George A. Nickerson . .
Second, Joseph H. White . . . . . .
LYCOPODS. — Four named varieties, Nathaniel T. Kidder . .
Second, Dr. C. G. Weld . . . . . .
DRACÆNAS. — Six named varieties, George A. Nickerson . . .
Second, Dr. C. G. Weld . . . . . .
CROTONS. — Six, named, in not less than eight-inch pots, Dr. C. G. Weld . . . . . .
Second, Dr. C. G. Weld . . . . . .
CYCAD. — Single plant, named, J. W. Howard . . . . .
Second, Elisha S. Converse . . . . . .
ORCHIDS. — Three plants, named varieties, in bloom, the second prize to James E. Rothwell . . . . . .
BEGONIA REX. — Six pots, of six varieties, James L. Little . .
Second, James L. Little . . . . . .
TUBEROUS BEGONIAS. — Six pots, of six varieties, James L. Little .
Second, James L. Little . . . . . .
OUVIRANDRA FENESTRALIS. — E. S. Converse . . . . . .

Gratuities : —

John Jeffries, Collection of Ferns . . . . . .
J. W. Howard, Collection of Palms . . . . . .
Jason S. Bailey, *Dipladenia amabilis* . . . . . .
Botanic Garden of Harvard University, Display . . . .
Joseph H. White, Display . . . . . .
John L. Gardner, " . . . . . .
J. W. Howard, " . . . . . .

OCTOBER 1.

Gratuity : —

Jason S. Bailey, Collection of Orchids . . . . . .

OCTOBER 31.

Gratuity: —

Oakes Ames, *Stanhopea oculata.* 2 00

CHRYSANTHEMUM SHOW.

NOVEMBER 10, 11, 12, AND 13.

CHRYSANTHEMUMS. — Display of twelve named plants, any or all classes, distinct varieties, Nathaniel T. Kidder . . . 50 00
Second, Walter Hunnewell 40 00
Third, Mrs. Benjamin P. Cheney 30 00
Twelve plants of twelve different varieties, grown to one stem and bloom, in not over six-inch pots, preference being given to plants not more than three feet in height, Samuel J. Trepess, 10 00
Second, James L. Little 8 00
Third, Dr. C. G. Weld 6 00
Fourth, J. W. Howard 4 00
Red, six plants, grown as above, but all of one color and of different varieties, James L. Little 5 00
Second. Dr. C. G. Weld 4 00
Third, Donald McRea 3 00
White, Dr. C. G. Weld 5 00
Second, James L. Little 4 00
Third, Elisha S. Converse 3 00
Pink, James L. Little 5 00
Second, Dr. C. G. Weld 4 00
Third, Elisha S. Converse 3 00
Yellow, James L. Little 5 00
Second, Dr. C. G. Weld 4 00
Third, Donald McRea 3 00
Six Reflexed, distinct named varieties, Mrs. Benjamin Cheney . 20 00
Specimen Incurved, named variety, Nathaniel T. Kidder . . . 6 00
Second, Nathaniel Kidder 5 00
Specimen Reflexed, named variety, Walter Hunnewell . . . 6 00
Second, C. W. Hubbard 5 00
Third, Mrs. Benjamin P. Cheney 4 00
Specimen Pompon, named variety, Mrs. Benjamin P. Cheney . 4 00
Group of plants arranged for effect, limited to one hundred and fifty square feet, preference being given to collections with palms or other foliage added, A. W. Blake 45 00
Second, Dr. C. G. Weld 40 00
Third, J. W. Howard 35 00
Fourth, Elisha S. Converse 30 00
Fifth, James Comley 25 00

Gratuities: —

Mrs. B. P. Cheney, Display of *Adiantum Farleyense* . . . 15 00
Walter Hunnewell, Display of Chrysanthemums 8 00

SOCIETY'S SILVER MEDALS.

February 1. Botanic Garden of Harvard University, *Angræcum sesquiped*
March 7. W. P. Winsor, *Cattleya Trianæ*, var. *alba*.
Spring Exhibition, March 24–27. Jackson Dawson, Crimson Rambler R
" " " " Dr. C. G. Weld, *Acacia Drummondii*
April 4. Nathaniel T. Kidder, *Cattleya intermedia*.
May Exhibition, May 2. Nathaniel T. Kidder, *Bougainvillæa glabra Sanderiana*.
May 23. John L. Gardner, Display of Orchids.
June 4. James Comley, New White Hydrangea.
Annual Exhibition, September 2 and 3. Jason S. Bailey, *Maranta r lineata*.
" " " " George Marston Whitin, *C dium argyrites*, *C. minus erubescens*, and *Diplad splendens*, var. *profusa*.
September 18. J. W. Manning, *Caryopteris Mastacanthus*.
November 28. J. E. Rothwell, *Cypripedium insigne* var. *Ernestii*.

APPLETON SILVER MEDAL.

July 11. Nathaniel T. Kidder, *Adamia versicolor*.

FIRST CLASS CERTIFICATES OF MERIT.

Spring Exhibition, March 24–27. J. F. Hess, *Streptocarpus Wendlandi*
April 25. R. & J. Farquhar, Spiræa Anthony Waterer.
June 4. Oakes Ames, *Cypripedium Sargentianum*.
Annual Exhibition, September 2 and 3. J. W. Howard, *Asparagus Spren*
October 1. Oakes Ames, Collection of Cypripediums.

HONORABLE MENTION.

Spring Exhibition, March 24–27. J. F. Hess, *Adiantum Æthiopicum*.
Rose and Strawberry Show, June 23 and 24. W. A. Manda, South Or N. J., *Rosa Wichuraia*
" " " " " " Nathaniel T. Kidder, *Sc burgkia tibicinis*.
August 15. Botanic Garden of Harvard University, *Angelonia angustif*
Chrysanthemum Show, November 10–13. Dr. C. G. Weld, *Browallia ciosa* var. *major*.

COMPLIMENTARY NOTICES.

April 25. R. & J. Farquhar, *Silene pendula* var. *Amalia*.
May 23. Ernest G. Buttrick, *Cypripedium arietinum*.
Rose and Strawberry Show, June 23 and 24. E. V. R. Thayer, *Odonto sum crispum* var.

REPORT

OF THE

COMMITTEE ON FLOWERS,

FOR THE YEAR 1896.

By J. WOODWARD MANNING, CHAIRMAN.

The past season has been remarkable in many respects: unusual weather conditions have prevailed, and as a consequence the exhibits were affected to a greater or less extent. The result was the retarding of many flowers in the early part of the summer; while in late summer and early autumn continued rains very seriously interfered with their perfection. On the whole, however, the exhibits have been exceedingly satisfactory throughout the year, and I believe that there has been a larger number of exhibitors than heretofore. This has been particularly noticeable from having drawn very severely upon the appropriation allowed the Committee for awarding gratuities in accordance with the respective merits of the exhibits. Several of the exhibitors have made interesting displays at most of the Saturday and regular exhibitions. These displays have not only been exceedingly creditable to the exhibitors, but have greatly improved the general effect of the hall. The Committee are, however, of the opinion that there has been more negligence in the matter of naming exhibits that are shown for gratuities alone than has been the case in the past, and they have made recommendations to the Committee for Establishing Prizes which it is hoped will obviate this difficulty in the future.

Exhibitions for gratuities commenced on the 4th of January,

with a choice collection of Chinese Primroses from Walt
Coburn, Freesias from Mrs. E. M. Gill, and Camellias
Orchids from James Comley and E. Sheppard & Son.

January 11 a very creditable display was made by s
parties, and choice Carnations were exhibited. David Nevins
a very interesting display of Violets, through his gardener,
ander McKay, and Camellias were shown in specimen bloo
James Comley.

The following Saturday W. E. Coburn displayed an unu
large and fine collection of single cut blooms of Chinese Prim
arranged in the Society's flat dishes. These were shown
view of emphasizing their great improvement of late ye
the range of color, size of bloom, and breadth and fimbr
of petals.

At the regular exhibition, February 1, David Nevins exh
Violets which excited unusual comment. Carnations were
fully shown, of which William C. Ward, of Queens, N. Y
hibited two large vases of Meteor and Bridesmaid, both of
were deemed worthy of Honorable Mention by your Comm
Camellias were staged in great variety of size and color, a
display of other cut flowers was large.

At each Saturday following, until the Spring Exhibition, l
displays were made, the principal exhibitors being Oakes A
James Comley, and Mrs. E. M. Gill. March 14, David N
showed some remarkably fine forced Hybrid Perpetual Roses
H. H. Hunnewell some new seedling Amaryllises, which e
much admiration.

SPRING EXHIBITION.

March 24, 25, 26, and 27.

At this exhibition most of the prizes were closely com
for, the display of Roses being particularly noteworthy
drawing forth much praise from an appreciative public. A
of American Beauty Roses from Charles V. Whitten wa
centre of attraction in the hall; they were remarkable fo
of flower, length of stem, excellence of foliage, and ke
quality. William H. Elliott displayed several magnificent
of Roses, which, in the general opinion of your Committee,

never been excelled by any exhibitor at the hall. There were no exhibitors of the Belle Siebrecht and Perle des Jardins Roses. The Carnation prizes were very freely competed for, William Nicholson being the principal exhibitor and carrying off several of the first prizes. The usual difficulty of maintaining Carnations in perfect condition for several days was encountered at this time, and as a result it was necessary for the Committee to make some changes in the final awards, where parties were negligent in the matter of renewing their exhibitions. Pansies were shown in great variety by Hon. Joseph S. Fay, and the Violet prizes were competed for by David Nevins, William C. Winter, and Harry S. Rand. Camellias were shown by Joseph H. White and James Comley. The increased number of exhibitions of Camellias was evidence of the renewed interest in this valuable class of late winter blooming plants; with a closer regard to the improvement of the fimbriated varieties it would seem that the class would regain something of its previous foothold in public estimation. James Comley displayed two pans of *Rhododendron Veitchianum*, with flowers of immaculate whiteness — large, fragrant, and of good keeping quality. This valuable winter blooming Rhododendron has been shown for several seasons past by the same exhibitor, and its great apparent value would seem to recommend it to others for cultivation. Displays of flowers were made at this time by Mrs. E. M. Gill, James Comley, and Oakes Ames.

April 4, James Comley exhibited forced Chinese Wistarias and made a large display of cut Roses. David Nevins staged Roses and Orchids.

April 11, Mrs. P. D. Richards made the first display of native plants; at this date the usual exhibits of cut flowers were made by other exhibitors.

MAY EXHIBITION.

May 2.

Tulips were not competed for at this exhibition. This, we believe, has been the case for one or two seasons back. It seems a pity that large exhibitions are not made of this valuable class of bulbs, as they could be shown to great advantage and would lend additional interest and variety to the show. Hardy Narcissuses were shown very creditably by Dr. C. G. Weld and the Bussey

Institution. Hon. Joseph S. Fay carried off all three pri
Pansies by a most remarkable display comprising a marvellou
and combination of coloring and great size of individual
Native plants were shown in great variety by Mrs. P. D. Ri
Miss Genevieve Doran, Misses Eleanor and Mollie Dora
Oakes Ames. There was no competition with Herbaceous Pl
either of the scheduled prizes, but the Botanic Garden of H
University took up a large portion of one side of the ha
an extremely interesting exhibit. Messrs R. and J. Farq
Company made a small exhibit of flowers of the new Canna
for which a Complimentary Notice was awarded by the Com

RHODODENDRON SHOW.

June 4 and 5.

At this show the competition for prizes was very close, the
pal exhibitors being James Comley, John L. Gardner, and
Trepess. There were not as many competitors as usual,
owing to the fact that the plants had received serious injur
the past very severe winter. The exhibits that were made we
creditable, and the general displays made by James Coml
H. H. Hunnewell occupied a large portion of the hall and at
great attention. Azaleas were shown in great variety, an
baceous Pæonies were displayed by John L. Gardner and
Hollis. Clematises and Hardy Flowering Trees and Shrub
not shown as well as usual. Herbaceous Plants were co
for, for the first time at this exhibition. Native Plant
present in large variety, and attracted much attention fr
public.

The exhibition on June 13 proved to be one of the most
worthy of the season; Herbaceous Pæonies, Oriental Poppie
Aquilegias were the principal flowers exhibited. Herb
Pæonies were shown in great variety by Thomas C. Thurlo
others, and a marked improvement in the cultivation
flowers exhibited was noticed. This proves the great intere
is being taken in Pæonies in general; the flowers showed a w
ful range of coloring, size, and perfection of bloom, and
varieties were noteworthy for their fragrance. The increas
of the exhibits has made it advisable in the opinion

Committee that a regular Pæony Exhibition be scheduled, with an increase in the amount of the prizes, as it would seem that Pæonies should have a merited recognition with Rhododendrons and Roses. Jackson Dawson exhibited a collection of new seedling Roses, hybrids of *Rosa multiflora*, all of which were particularly interesting; they comprised a variety of color and size of bloom, in very small double flowers arranged in dense panicles, and your Committee awarded the Society's Silver Medal for the display. Another Society's Silver Medal was awarded the same skilful cultivator for a new Hybrid Rose, a cross between *Rosa Wichuraiana* and General Jacqueminot; and Honorable Mention was given him for a new seedling Double White Rose originating from the Boston Belle.

ROSE AND STRAWBERRY EXHIBITION.

June 23 and 24.

The prizes for Roses called forth a close competition by a large number of exhibitors, and the quality of the individual blooms has never been surpassed. Hon. Joseph S. Fay was the largest exhibitor, and carried off many first prizes; the quality and variety of his flowers was an ample testimonial to the extent of his collection and the skill of his gardener, M. H. Walsh. Most of the prizes scheduled were competed for, and altogether the exhibition proved very satisfactory. Polyantha Roses, however, did not receive the attention which we hoped would be given them. At this exhibition, John Jeffries made a display of Japanese Pæonies which was particularly unique, and received the Society's Silver Medal. The display consisted of very finely formed single flowered varieties, and others with broad overlapping guard petals and a ball of numerous narrow, twisted, golden and variegated petals in the centre. At this display, also, a First Class Certificate was awarded to Hon. Joseph S. Fay for his new Rose, Lillian Nordica.

On the following Saturday, a very large exhibit of Roses was made, occupying a considerable portion of the lower hall. *Iris Kœmpferi*, *Lilium candidum*, and Hardy Carnations were very little shown at this date. In the case of *Iris Kœmpferi* it was due to the flowers not being in perfection at that time. The Botanic

Garden of Harvard University made a very large display of
Herbaceous Perennials, occupying the entire right-hand sid
lower hall, and M. H. Walsh, gardener to Hon. Joseph
displayed a new seedling Rose named "Joseph S. Fa
which the Society awarded Honorable Mention.

Hollyhocks were so seriously injured by the past wint
no display was made on the regular prize day (July 11);
this flower seemed to have suffered more severely than for
previous seasons.

Native Plants continued to be a feature throughout the
of the season, and the competition being close it was diffic
your Committee to decide awards, and we would repeat th
gestion made by the Chairman of the Flower Committee
year, which is: That we believe it to be unjust in some resp
both Committee and Exhibitors, to ask the regular Flower
mittee to judge botanical collections of Native Plants, as it
be far better in our estimation for a competent botanist or
mittee of botanists to judge upon these exhibits. We ar
glad to note that a skilled botanist has been added to our
mittee this season, as this will largely obviate the difficulty
tioned.

July 18, Gloxinias and Tuberous Begonias were sho
variety, and the prize for Hardy Ferns was closely compete
drawing out some very noteworthy exhibitions. On this day
Joseph S. Fay made a very large display of Hollyhocks, Ph
Roses, and Delphiniums, and Hon. John Simpkins (James B
gardener) made a remarkable exhibition of Aquatic Plants
excited great admiration. Arthur E. French exhibited
same time a collection of Grasses and Sedges which was
interesting.

July 25, Sweet Peas were shown in great perfection, a
Botanic Garden of Harvard University made a display of
ceous Plants, probably the largest ever seen in the hall, for
your Committee awarded the Society's Silver Medal.

August 8 brought forth the largest display of Annuals
has been seen in the hall for many years. The Society's
were generously competed for, and in addition to this the B
Garden of Harvard University made a special display of An
which occupied an entire side of the hall, comprising the
remarkable variety and arranged in a most effective manner

for which a Society's Silver Medal was awarded. At this date Dahlias were first shown, and continued to be an interesting feature of the display until the end of their season. The new Double Rudbeckia (*R. laciniata* var. Golden Glow), a very choice new Hardy Herbaceous Perennial, growing six to seven feet high, forming a broad, sturdy bush with a great profusion of very double bright yellow flowers on long clean stems, was shown simultaneously by Rea Brothers and Jacob W. Manning, to both of whom First Class Certificates were awarded therefor. Henry A. Dreer, of Philadelphia, staged a new variety of Nelumbium, named Shiroman, of the purest white, for which a First Class Certificate was awarded; also the new Nymphæa, O'Marana, of which Honorable Mention was made. The display of Gladioli did not come up to the standard of past seasons, probably owing to conditions of the weather.

The prizes for Annual Asters were competed for on the twenty-second of August in several classes, but owing to the weather and insect depredations the display was not as large as in past seasons. L. W. Goodell made a display of Drummond Phlox which was remarkable for the variety of colors shown and the range in size and form of the flowers; also a very creditable display of Salpiglossis. A tank of foliage and flowers of the *Nelumbium luteum* was shown by J. Woodward Manning from a native locality; these attracted much attention.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

September 2 and 3.

The exhibition was particularly noteworthy for its display of Aquatics, of which John Simpkins and Oakes Ames were the principal exhibitors. Dahlias also were a prominent feature of the exhibition, and excited much rivalry among the exhibitors. Cannas were freely shown, but it was justly remarked that these are better exhibited as plants than displayed as cut flowers, from the fugaciousness of their petalage. Oakes Ames (Carl Blomberg, gardener) exhibited a new Nymphæa, a cross between *Nymphœa Zanzibarensis* and its variety *rosea*, named Mrs. Anna C. Ames, the flowers of which were amaranth crimson with the base of the petals shaded to pure white, for which your Committee awarded a First Class Certificate of Merit. To Miss Eliza Wellington, of East Lexington, a First Class Certificate of Merit was awarded

for superior cultivation and exhibition of *Clianthus Dampi* to J. F. Huss a First Class Certificate of Merit was awar *Pennisetum Ruppellii*, a new annual grass resembling a mi Eulalia, but with long, close feathery blooms, of a showy p tinge, being closely allied to Squirrel Grass. Honorable M was also granted James Comley for a new Perennial Pea, between *Lathyrus latifolius* and *L. odoratus*.

October 16, Hon. John Simpkins made a display of early anthemums, and a special vase of the Chrysanthemum Mrs. Robinson, for which a First Class Certificate of Merit was a This white variety seems remarkable for its large flowers, p color, and earliness.

CHRYSANTHEMUM SHOW.

November 10, 11, 12, and 13.

The Chrysanthemum Show was a success in every sense word. The marvellous size and perfection of the flowers gave sure proof of the excellence of their culture. Com was close, rendering the matter of judgment on the part Committee difficult. The principal exhibitors were Hon Simpkins, Joseph H. White, Charles Souther, Mrs. Benja Cheney, W. Slack, J. W. Howard, and the Waban Conserva In cut single blooms, Mr. Simpkins's display was marvello flower being noted with a circumference of twenty-five inche vases of ten blooms each were shown to the greatest advant the Waban Conservatories. The display for effect, in the S large vases, was particularly interesting, and the prizes we closely competed for. There seems to be no lack of interest in the culture of the Chrysanthemum, and it was the general of the Committee that competition was as close as in any p year. In the new seedlings, J. Eaton, jr., carried off the p the best pink variety with Quissett, and for a white variet Nonquit. Joseph H. White received the first prize for t silvery pink incurved variety, Li Hung Chang, and Charles S exhibited a very creditable new bronze colored seedling name. A display of Violets was made by François Sup Germantown, Penn., which attracted much attention, an Class Certificates of Merit were awarded for each of the v

Luxonne, a very large, single, intensely fragrant, rich blue flower, and Princess des Galles, a single flower of a deeper shade of blue.

The display of Aquatics throughout the season has been unusually good, the principal exhibitor outside of the regular exhibitions being Oakes Ames (Carl Blomberg, gardener). The importance of this class of plants is manifest, and it seems advisable that a special day should be set apart for a general display of them.

The difficulty of combining a display of plants and flowers of Chrysanthemums on the same day to cover all classes, including early and late varieties, has been very apparent, more especially affecting as it does the early blooming sorts. For that reason it seems advisable that special prizes be offered for the early blooming sorts at an earlier date than the regular Chrysanthemum Show. The increased interest that has been taken by cultivators of the early blooming sorts, and the marvellous number of named varieties of such, has made it seem necessary that some action be taken in recognition of this class.

The increase in the number of displays and new varieties of plants has been such as seriously to cut into the appropriation in many instances during the year. For this reason it is deemed advisable by the Committee to insist more particularly in the future on the correct naming of each variety of flower exhibited for gratuities. This seems necessary both for the good of the Society and the enlightenment of the public, and also to enable the Committee to keep within the appropriation allowed by the Society.

The display of Herbaceous Plants for the year has been disappointing from the lack of competition. It seems that the effort of the Committee on Establishing Prizes to gain more exhibitors by decreasing the required number of vases and increasing the awards has not had the desired effect. The Flower Committee regret that this condition exists, and hope that another year may bring closer competition in this valuable class of plants. The displays of Native Plants have been ample, and at times have taxed the capacity of the space allowed them. The competition has been close, and the exhibitions have attracted much attention from the public.

The amount appropriated for the year 1896 was . .
We have awarded in prizes and gratuities, including medals . . . . . .

Making a deficit of . . . . . .

All of which is respectfully submitted,

J. Woodward Manning,
Michael H. Norton,
Thomas C. Thurlow,
Kenneth Finlayson,
Frederick S. Davis,
} *Co*

PRIZES AND GRATUITIES AWARDED FOR FLOWERS.

1896.

January 4.

Gratuities : —

James Comley, Camellias, Orchids, etc.	$4 00
W. E. Coburn, Chinese Primroses	1 00
Mrs. E. M. Gill, Freesias	1 00
E. Sheppard & Son, Dendrobiums	1 00

January 11.

Gratuities : —

David Nevins, Display of Violets	2 00
W. N. Craig, Vase of Freesia refracta	1 00
W. N. Craig, Vase of Mixed Carnations	1 00
Peter Fisher, Vase of Carnation Edith Foster	1 00
William Nicholson, Vase of Carnation White Queen	1 00
James Comley, Display of Camellias	1 00
Mrs. E. M. Gill, Display of Flowers	1 00

January 18.

Gratuities : —

Walter E. Coburn, Primroses	2 00
E. Sheppard & Son, Cinerarias and Dendrobiums	1 00

January 25.

Gratuities : —

James Comley, Display of Flowers	5 00
Oakes Ames, " " "	5 00

February 1.

Violets. — Best collection of varieties, fifty blooms of each in a bunch, David Nevins	4 00
Second, William C. Winter	3 00
Carnations. — Display of cut blooms, with foliage, not less than six varieties, in vases, William C. Ward	8 00
Second, William Nicholson	6 00
Camellias. — Display of named varieties, cut flowers with foliage, not less than twelve blooms, of not less than six varieties, James Comley	4 00
Second, James Comley	3 00

Gratuities : —

James Comley, Display of Flowers	3 00
Oakes Ames, " " "	3 00
Mrs. E. M. Gill, " " "	2 00
Peter Fisher, Display of Carnations	1 00

FEBRUARY 8.

Gratuities : —

James Comley, Camellias . . . . . .
E. Sheppard & Son, Orchids and Cinerarias . . . . .
Oakes Ames, Display of Flowers . . . . . .
Bussey Institution, Forced Shrubs and Anemones . . .

FEBRUARY 15.

Gratuity : —

James Comley, Display of Flowers . . . . . .

FEBRUARY 29.

Gratuities : —

James Comley, Display of Flowers . . . . . .
Mrs. E. M. Gill, " " " . . . . . .
James Comley, Display of Orchids . . . . . .

MARCH 7.

Gratuities : —

James Comley, Display of Flowers . . . . . .
Mrs. E. M. Gill, " " " . . . . . .

MARCH 14.

Gratuities : —

David Nevins, Hybrid Perpetual Roses . . . . . .
James Comley, Roses and Lilacs . . . . . .
H. H. Hunnewell, Amaryllises . . . . . .
Oakes Ames, Collection of Flowers . . . . . .

MARCH 21.

Gratuities : —

David Nevins, Hybrid Perpetual Roses . . . . . .
James Comley, Roses . . . . . .
Oakes Ames, Flowers . . . . . .

SPRING EXHIBITION.

MARCH 24, 25, 26, AND 27.

HYBRID PERPETUAL ROSES. — Twelve blooms, of not less than f
distinct named varieties, David Nevins . . . .
Second, James Comley . . . . . .
HYBRID PERPETUAL ROSES. — Six blooms, not less than three na
varieties, David Nevins . . . . . .
Twelve blooms of Ulrich Brunner, G. M. Anderson . .
Second, David Nevins . . . . . .

TENDER ROSES IN VASES. — Twelve blooms of American Beauty, Charles V. Whitten	15 00
Twenty-five blooms of Bridesmaid, William H. Elliott	12 00
Second, Charles V. Whitten	10 00
Twenty-five blooms of Meteor, the second prize to Charles V. Whitten	10 00
Twenty-five blooms of Mrs. J. Pierpont Morgan, John N. May, Summit, N. J.	12 00
Twenty-five blooms of The Bride, William H. Elliott	12 00
Second, Charles V. Whitten	10 00
Twenty-five blooms of Catherine Mermet, William H. Elliott	8 00
Second, Charles V. Whitten	6 00
Twenty-five blooms of Papa Gontier, William H. Elliott	8 00
Vase of fifty blooms of assorted varieties of Roses, David Nevins,	20 00
Second, Charles V. Whitten	16 00
CARNATIONS. — Twenty-five blooms of any Crimson variety, William Nicholson for Ferdinand Mangold	3 00
Twenty-five blooms of any Dark Pink variety (William Scott or darker), William Nicholson for Nickerson	3 00
Second, William Nicholson for William Scott	2 00
Twenty-five blooms of any Light Pink variety (lighter than William Scott), William H. Elliott for Albertina	3 00
Twenty-five blooms of any Scarlet variety, William Nicholson for Hector	3 00
Twenty-five blooms of any White variety, William Nicholson for Crystal	3 00
Twenty-five blooms of any Yellow variety, William Nicholson for Eldorado	3 00
PANSIES. — Forty-eight cut blooms, not less than twenty-four varieties, in the Society's flat fruit dishes, Hon. Joseph S. Fay	4 00
VIOLETS. — Bunch of fifty blooms of Czar, Harry S. Rand	2 00
Bunch of fifty blooms of Lady Hume Campbell, David Nevins	2 00
Second, William C. Winter	1 00
Bunch of fifty blooms of Marie Louise, David Nevins	2 00
Second, Harry S. Rand	1 00
Bunch of fifty blooms of any other variety, David Nevins for Swanley White	2 00
CAMELLIAS. — Display of named varieties, cut flowers with foliage, not less than twenty-four blooms, of not less than six varieties, Joseph H. White	4 00
Second, James Comley	3 00
Gratuities: —	
David Nevins, Roses and Orchids	15 00
James Comley, Display of Roses, Orchids, etc.	15 00
Oakes Ames, " " "	5 00

James Comley, *Rhododendron Veitchianum*
Harry S. Rand, Collection of Violets
George M. Anderson, Vase of Catherine Mermet Roses
Jason S. Bailey, Spike of *Dendrobium thyrsiflorum*
Mrs. E. M. Gill, Display of Flowers

APRIL 4.

Gratuities: —

David Nevins, Display of Roses and Orchids
James Comley, Display of Roses
James Comley, Display of Wistarias

APRIL 11.

Gratuities: —

Charles V. Whitten, Two Vases of Roses
Hon. Joseph S. Fay, Display of Pansies
James Comley, Display of Orchids
James Comley, Display of Flowers
Oakes Ames, " " "
Mrs. E. M. Gill, " " "
Mrs. P. D. Richards, Native Flowers

APRIL 18.

Gratuities: —

Hon. Joseph S. Fay, Display of Pansies
Mrs. E. M. Gill, Flowers
Mrs. P. D. Richards, Native Plants

APRIL 25.

Gratuity: —

James Comley, Display of Flowers

MAY EXHIBITION.

MAY 2.

HARDY NARCISSUSES. — Collection of not less than ten named varieties of blooms, in vases, Dr. C. G. Weld
Second, Bussey Institution

PANSIES. — Forty-eight blooms, not less than twenty-four varieties in the Society's flat fruit dishes, Hon. Joseph S. Fay
Second, Hon. Joseph S. Fay
Third, Hon. Joseph S. Fay

NATIVE PLANTS. — Mrs. P. D. Richards
Second, Genevieve Doran
Third, Oakes Ames

Gratuities: —

Hon. Joseph S. Fay, Display of Pansies	8 00
Botanic Garden of Harvard University, Herbaceous Plants	6 00
Charles V. Whitten, Tulips	3 00
Charles V. Whitten, Vase of Roses	2 00
William Nicholson, Vase of Carnations	1 00
James Comley, Flowers	3 00
Oakes Ames, "	3 00
Mrs. E. M. Gill, "	1 00

MAY 9.

Gratuities: —

Hon. Joseph S. Fay, Pansies	2 00
Oakes Ames, Flowers	4 00
Mrs. P. D. Richards, Native Flowers	3 00

MAY 16.

Gratuities: —

Rea Brothers, Tulips	2 00
James Comley, Flowers	5 00
Mrs. E. M. Gill, "	1 00
Mrs. P. D. Richards, Native Plants	2 00

MAY 28.

Gratuities: —

Oakes Ames, Roses	2 00
James Comley, Flowers	5 00
Mrs. E. M. Gill, "	1 00
Misses Eleanor and Mollie Doran, Native Flowers	1 00
Mrs. P. D. Richards, " "	1 00
Alice L. Grinnell, " "	1 00

RHODODENDRON SHOW.

JUNE 4 AND 5.

H. H. Hunnewell Fund.

RHODODENDRONS. — Twelve distinct varieties, of unquestionable hardiness, named, James Comley, a piece of plate valued at	20 00
Second, Samuel Trepess, a piece of plate valued at	15 00
Six distinct varieties, of unquestionable hardiness, named, John L. Gardner	10 00
Second, James Comley	5 00
Six tender varieties, named, James Comley	5 00
Three tender varieties, named, James Comley	4 00

HARDY AZALEAS. — From any or all classes, fifteen varieties, on vase of each, James Comley . . . . . .
Twelve varieties, one vase of each, James Comley . .
Six varieties, one vase of each, John L. Gardner . . .
Cluster of Trusses of one variety, Oakes Ames . . .
Second, John L. Gardner . . . . . .
HERBACEOUS PÆONIES. — Collection of named varieties, John L Gardner . . . . . .
Second, George Hollis . . . . . .
GERMAN IRISES. — Six distinct varieties, three spikes of each, John L. Gardner . . . . . .
Second, Walter H. Cowing . . . . . .
HARDY PYRETHRUMS. — Display, Kenneth Finlayson . .
Second, Charles V. Whitten . . . . . .
HERBACEOUS PLANTS. — Reading Nursery . . . . .
Second, Rea Brothers . . . . . .
NATIVE PLANTS. — Collection not exceeding thirty bottles of name species and varieties, one bottle of each, Mrs. P. D. Richards
Second, Oakes Ames . . . . . .
Third, Misses Eleanor and Mollie Doran . . . . .
VASE OF FLOWERS. — Mrs. A. D. Wood . . . . .
Second, Mrs. E. M. Gill . . . . . .

Gratuities: —

H. H. Hunnewell, Rhododendrons . . . . . .
James Comley, " . . . . . .
Mrs. Benjamin P. Cheney, Rhododendrons and Azaleas . .
John L. Gardner, Rhododendrons, etc. . . . . .
Hon. Joseph S. Fay, Cut Shrubs and Flowers . . . . .
James Comley, Hardy Trees and Shrubs . . . . . .
Oakes Ames, Aquatics . . . . . .
Walter H. Cowing, German Irises . . . . . .
Walter H. Cowing, Oriental Poppies . . . . . .
Hon. Joseph S. Fay, Pansies . . . . . .
Frederick S. Davis, Aquilegias . . . . . .
Mrs. E. M. Gill, Flowers . . . . . .
Leverett M. Chase, Flowers . . . . . .
James Comley, Orchids . . . . . .

JUNE 13.

HERBACEOUS PÆONIES. — Collection of named varieties, Thom C. Thurlow . . . . . .
Second, Dr. C. G. Weld . . . . . .
Third, George Hollis . . . . . .
ORIENTAL POPPIES. — Collection, named, Walter H. Cowing .

Aquilegias. — Collection, named, Frederick S. Davis	3 00
Second, F. A. Blake	2 00
Third, Walter H. Cowing	1 00
Foxgloves. — Twelve spikes, Walter H. Cowing	2 00
Gratuities: —	
James Comley, Rhododendrons, Roses, etc.	15 00
Oakes Ames, Display of Aquatics and Flowers	10 00
Hon. Joseph S. Fay, Roses	10 00
Hon. Joseph S. Fay, Display of Pæonies	5 00
James Comley, Hardy Shrubs	5 00
Hon. Joseph S. Fay, Pæonies	3 00
Oakes Ames, Water Lilies	3 00
Hon. Joseph S. Fay, Collection of Hardy Trees and Shrubs	2 00
Hon. Joseph S. Fay, Roses	2 00
Walter H. Cowing, Spanish Irises	2 00
George Hollis, Display of Seedling Pæonies	2 00
O. B. Hadwen, Display of Pæonies	1 00
Rea Brothers, Display of Perennials	1 00
Mrs. E. M. Gill, Display of Flowers	3 00
Mrs. P. D. Richards, Native Flowers	1 00

ROSE EXHIBITION.

June 23 and 24.

Special Prize Theodore Lyman Fund.

Hardy Roses. — Twenty-four distinct named varieties, three of each variety, Hon. Joseph S. Fay, in money or plate of equal value	25 00
Second, Mrs. J. W. Clark, Pomfret, Conn., in money or plate of equal value	20 00

Special Prizes offered by the Society.

Six blooms of Alfred Colomb, the second prize to Hon. Joseph S. Fay	2 00
Six blooms of Baroness Rothschild, Hon. Joseph S. Fay	3 00
Second, Dr. C. G. Weld	2 00
Six blooms of John Hopper, Hon. Joseph S. Fay	3 00
Six blooms of Marquise de Castellane, Hon. Joseph S. Fay	3 00
Six blooms of Merveille de Lyon, Hon. Joseph S. Fay	3 00
Second, Dr. C. G. Weld	2 00
Six blooms of Mme. Gabriel de Luizet, Hon. Joseph S. Fay	3 00
Second, Dr. C. G. Weld	2 00
Six blooms of Mme. Victor Verdier, Hon. Joseph S. Fay	3 00
Second, Dr. C. G. Weld	2 00

Six blooms of Prince Camille de Rohan, Mrs. J. W. Clark .
Second, Hon. Joseph S. Fay . . . . . .
Twelve blooms of any other variety, Hon. Joseph S. Fay, for Duke of Edinburg . . . . . .
Second, Mrs. J. W. Clark, for Magna Charta . . . .

Regular Prizes.

Sixteen distinct named varieties, three of each variety, Hon. Joseph S. Fay . . . . . .
Second, Mrs. J. W. Clark . . . . . .
Twelve distinct named varieties, three of each, Hon. Joseph S. Fay
Second, Dr. C. G. Weld . . . . . .
Six distinct named varieties, three of each, Hon. Joseph S. Fay .
Second, Dr. C. G. Weld . . . . . .
Third, Mrs. J. W. Clark . . . . . .
Three distinct varieties, named, three of each, Hon. Joseph S. Fay,
Twenty-four distinct named varieties, one of each, the second prize to Mrs. J. W. Clark . . . . . .
Third, Hon. Joseph S. Fay . . . . . .
Eighteen distinct named varieties, one of each, the second prize to James Comley . . . . . .
Third, Hon. Joseph S. Fay . . . . . .
Twelve distinct named varieties, one of each, Hon. Joseph S. Fay .
Six distinct named varieties, one of each, Hon. Joseph S. Fay .
Second, Dr. C. G. Weld . . . . . .
Third, Miss Mary S. Walker . . . . . .
Moss Roses. — Six distinct named varieties, three clusters of each, Dr. C. G. Weld . . . . . .
Third, Hon. Joseph S. Fay . . . . . .
Hybrid Tea Roses. — Six named varieties, buds admissible, Hon. Joseph S. Fay . . . . . .
General Display. — One hundred bottles of Hardy Roses, buds admissible, Hon. Joseph S. Fay . . . . . .
Second, Mrs. J. W. Clark . . . . . .
Third, James Comley . . . . . .
Fourth, Mrs. E. M. Gill . . . . . .
Fifth, Hon. Joseph S. Fay . . . . . .
Basket of Roses. — Arranged for effect, to be shown the second day, James Comley . . . . . .
Second, Mrs. E. M. Gill . . . . . .
Sweet Williams. — Thirty spikes, not less than six distinct varieties, Samuel Trepess . . . . . .
Second, Walter H. Cowing . . . . . .
Third, Oakes Ames . . . . . .
Fourth, Walter E. Coburn . . . . . .

VASE OF FLOWERS. — Best arranged, in one of the Society's glass vases, Mrs. A. D. Wood 5 00
Second, Mrs. E. M. Gill 4 00

Gratuities: —

Hon. Joseph S. Fay, Display of Roses 25 00
Hon. Joseph S. Fay, " " " 8 00
Hon. Joseph S. Fay, " " " 5 00
Hon. Joseph S. Fay, Bank of Roses 3 00
Hon. Joseph S. Fay, Display of Mad. Gabriel de Luizet Roses . 6 00
J. Eaton, jr., Roses 10 00
James Comley, " 10 00
James Comley, " 3 00
James Comley, Stand of Roses 3 00
Dr. C. G. Weld, Roses 8 00
Mrs. J. W. Clark, " 5 00
Patrick Kane, " 4 00
Mrs. E. A. Wilkie, Three Vases of Roses 3 00
William H. Spooner, Display of Roses 3 00
Jackson Dawson, " " " 2 00
Mrs. E. M. Gill, " " " 1 00
L. W. Goodell, Aquatics 10 00
Oakes Ames, " 8 00
Dr. C. G. Weld, Display of Sweet Williams and Roses . . . 4 00
Walter E. Coburn, Pelargoniums 3 00
Rea Brothers, Hardy Perennials 3 00
Walter H. Cowing, English Irises 3 00
Walter E. Coburn, Stand of Sweet Williams 2 00
A. F. Estabrooks, Pæonies 1 00
O. B. Hadwen, " 1 00
Edwin Sheppard, Sweet Williams 1 00
Samuel J. Trepess, Foxgloves 1 00
Oakes Ames, Display of Flowers 10 00
James Comley, Flowers 3 00
Mrs. P. D. Richards, Native Flowers 2 00

JUNE 27.

HARDY ROSES. — Collection, named, not less than twenty-five varieties, filling fifty vases, one rose in each vase, Hon. Joseph S. Fay 15 00
Second, Hon. Joseph S. Fay 10 00
Third, James Comley 6 00
Fourth, Hon. Joseph S. Fay 4 00
IRIS KÆMPFERI. — Six varieties, three of each, in vases, John L. Gardner 4 00
ENGLISH IRISES. — Best collection, Walter H. Cowing . . . 3 00

DELPHINIUMS. — Collection of twenty spikes, not less than five va
eties, Dr. C. G. Weld . . . . . .
Third, Oakes Ames . . . . . .
CAMPANULA MEDIUM. — Collection, not less than twelve bottles, I
C. G. Weld . . . . . .
HERBACEOUS PLANTS. — Thirty bottles, Reading Nursery .
Third, Rea Brothers . . . . . .
VASE OF FLOWERS. — Mrs. E. M. Gill . . . . . .
Second, Mrs. A. D. Wood . . . . . .

Gratuities : —

Hon. Joseph S. Fay, Display of Roses . . . . . .
James Comley, " " " . . . . . .
Oakes Ames, " " " . . . . . .
Patrick Kane, " " " . . . . . .
Mrs. E. M. Gill, Roses . . . . . .
William H. Spooner, Display of Roses . . . . . .
Botanic Garden of Harvard University, Hardy Herbaceous Per
nials . . . . . .
Oakes Ames, Display of Aquatics . . . . . .
Walter E. Coburn, Pelargoniums and Sweet Peas . . .
Bussey Institution, Lilies and Delphiniums . . . .
Dr. C. G. Weld, Sweet Williams . . . . . .
Mrs. E. M. Gill, Flowers . . . . . .
Mrs. P. D. Richards, Wild Flowers . . . . . .

JULY 11.

NATIVE PLANTS. — Collection, not exceeding forty bottles of nan
species and varieties, one bottle of each, Mrs. P. D. Richar
Second, Genevieve Doran . . . . . .
Third, Oakes Ames . . . . . .
VASE OF FLOWERS. — Best arranged, in one of the Society's gl
vases, James Comley . . . . . .
Second, Mrs. A. D. Wood . . . . . .

Gratuities : —

Oakes Ames, Display of Aquatics . . . . . .
Reading Nursery, Hardy Flowers . . . . . .
Rea Brothers, Hardy Perennials . . . . . .
Walter H. Cowing, Shirley Poppies . . . . . .
John Jeffries, Nasturtiums and Japanese Irises . . .
Hattie B. Winter, Vase of Flowers . . . . . .
James Comley, Display of Flowers . . . . . .
Mrs. E. M. Gill, " " " . . . . . .

JULY 18.

GLOXINIAS. — Twelve vases, cut blooms, three in each vase, arranged with any foliage, Jason S. Bailey	5 00
Second, Dr. C. G. Weld	4 00
Third, James L. Little	3 00
TUBEROUS BEGONIAS. — Twelve vases, three in each vase, arranged with any foliage, Dr. C. G. Weld	4 00
Second, Elisha S. Converse	3 00
HARDY FERNS. — Display of named species and varieties, Oakes Ames	7 00
Second, Mrs. P. D. Richards	5 00
Third, Mrs. Mary E. Loud	3 00

Gratuities: —

Hon. Joseph S. Fay, Hollyhocks, Phloxes, Roses, Larkspurs, etc.	20 00
Hon. John Simpkins, Display of Aquatics	20 00
Oakes Ames, " " "	4 00
Oakes Ames, Roses, Japanese Irises, etc.	3 00
John Jeffries, Antirrhinums	2 00
Rea Brothers, Hardy Plants	2 00
Dr. C. G. Weld, Gloxinias	2 00
Dr. C. G. Weld, Begonias	2 00
Sumner Coolidge, Hardy Carnations	1 00
James Comley, Display of Flowers	8 00
Mrs. E. M. Gill, Flowers	3 00
Arthur E. French, Collection of Sedges and Grasses	3 00

JULY 25.

SWEET PEAS. — Display, filling thirty vases, arranged with any foliage, H. A. Jones	6 00
Second, E. A. Weeks	4 00
Third, Samuel J. Trepess	3 00
Display of named varieties, in vases, six sprays in each vase, H. A. Jones	4 00
Second, E. A. Weeks	3 00
Third, F. A. Blake	2 00
VASE OF FLOWERS. — For table decoration, James Comley	4 00
Second, Hattie B. Winter	3 00

Gratuities: —

Oakes Ames, Display of Aquatics	10 00
James Comley, Display of Flowers	5 00
Mrs. E. M. Gill, " " "	2 00
John Jeffries, " " "	1 00
Mrs. P. D. Richards, Display of Native Plants	1 00

August 1.

Perennial Phloxes. — Ten distinct named varieties, one spike of each, the second prize to John L. Gardner . . . . .
Third, George Hollis . . . . . .
Native Flowers. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each, Mrs. P. D. Richards,
Second, Miss Genevieve Doran . . . . . .
Third, Oakes Ames . . . . . .

Gratuities : —

Oakes Ames, Aquatics . . . . . .
Bussey Institution, Montbretias, Sweet Peas, etc. . . . . .
Jason S. Bailey, Orchids and Roses . . . . . .
George Hollis, Display of Phloxes . . . . . .
E. Sheppard, Phloxes and Zinnias . . . . . .
John L. Gardner, Phloxes and Gladioli . . . . . .
A. Lummus, Dahlias . . . . . .
Arthur F. Coolidge, Verbenas and other Flowers . . . . .
Rea Brothers, Hardy Herbaceous Perennials . . . . . .
James Comley, Display of Flowers . . . . . .
James Comley, Vase of Flowers . . . . . .
Mrs. A. D. Wood, Flowers . . . . . .
Mrs. E. M. Gill, " . . . . . .
Mrs. E. M. Gill, Vase of Wild Flowers . . . . . .

August 8.

Annuals. — General display, named, filling not less than one hundred and fifty bottles, Oakes Ames . . . . . .
Second, Mrs. E. M. Gill . . . . . .
Third, Miss A. D. Coolidge . . . . . .

Gratuities : —

Joseph H. White, Collection of Sweet Peas . . . . . .
Rev. W. T. Hutchins, Sweet Peas . . . . . .
Bussey Institution, Sweet Peas, Gladioli, and Montbretias . .
J. Warren Clark, Seedling Gladioli . . . . . .
Botanic Garden of Harvard University, Collection of Hardy Phloxes,
George Hollis, Cannas and Phloxes . . . . . .
Rea Brothers, Hardy Perennials . . . . . .
A. Lummus, Dahlias . . . . . .
James Comley, Display of Flowers . . . . . .
William C. Winter, Flowers . . . . . .

August 15.

Gladioli. — Twenty named varieties, in spikes, J. Warren Clark .
Ten named varieties, in spikes, John Parker . . . . .
Second, J. Warren Clark . . . . . .

Six named varieties, in spikes, J. Warren Clark	2 00
Second, Walter H. Cowing	1 00
Display of named and unnamed varieties, filling one hundred vases, arranged for effect with any foliage, J. Warren Clark	8 00

Gratuities: —

John Jeffries, Drummond Phlox	2 00
Walter H. Cowing, Display of Cannas	2 00
F. A. Blake, Salpiglossis	1 00
F. A. Blake, Petunias	1 00
William E. Endicott, Dahlias	1 00
A. Lummus, "	1 00
James Comley, Display of Flowers	5 00
Oakes Ames, " " "	4 00
Bussey Institution, " " "	3 00
Mrs. E. M. Gill, Flowers	2 00
Alice L. Grinnell, Native Plants	1 00
Mrs. P. D. Richards, " "	1 00

AUGUST 22.

ASTERS. — Large Flowered, of all classes, fifty vases, not less than twelve varieties, three flowers in each vase, James Comley	4 00
Second, F. A. Blake	3 00
Third, Sumner Coolidge	2 00
Victoria Flowered, thirty blooms, not less than twelve varieties, Charles H. Souther	3 00
Second, Elisha S. Converse	2 00

Gratuities: —

Botanic Garden of Harvard University, Herbaceous Plants	8 00
J. Woodward Manning, *Nelumbium luteum*	3 00
A. Lummus, Dahlias	2 00
L. W. Goodell, Drummond Phlox	2 00
L. W. Goodell, Salpiglossis	2 00
Mrs. H. J. Stockford, Begonias and Sweet Peas	1 00
Edwin Sheppard, China Asters	1 00
John Parker, Gladioli, etc.	1 00
Bussey Institution, Flowers	1 00
James Comley, "	2 00
George Hollis, "	1 00
Mrs. E. M. Gill, "	1 00
Mrs. P. D. Richards, Native Plants	1 00

ANNUAL EXHIBITION OF PLANTS AND FLOW

September 2 and 3.

Special Prize, Theodore Lyman Fund.

Aquatic Plants. — General Display of Nymphæas, Nelumbiums, and other Aquatic Plants, to include not less than twenty-five blooms of Nymphæas, Hon. John Simpkins . . . .
Display of twelve Nymphæas and Nelumbiums, the second prize to Oakes Ames . . . . . .

Regular Prizes.

Dahlias. — Double, twelve blooms, distinct named varieties, H. F. Burt . . . . . .
Second, John Parker . . . . . .
Third, Lothrop & Higgins . . . . . .
Six blooms, distinct named varieties, H. F. Burt . . . . .
Second, Lothrop & Higgins . . . . . .
Third, L. W. Snow . . . . . .
Specimen bloom, Lothrop & Higgins . . . . . .
Second, L. W. Snow . . . . . .
Liliputian Dahlias, Display of twenty-five bottles, not less than eight named varieties, L. W. Snow . . . . . .
Second, William C. Winter . . . . . .
Third, A. Lummus . . . . . .
Single Dahlias, Display of not less than eight varieties, William E. Endicott . . . . . .
Cactus Dahlias, Display filling eighteen bottles, not less than six varieties, H. F. Burt . . . . . .
Second, William E. Endicott . . . . . .
Lilium Lancifolium. — Collection of named varieties, Sumner Coolidge . . . . . .
Tropæolums. — Display, with their own foliage, filling twenty-five vases, Dr. C. G. Weld . . . . . .
Second, Miss A. L. Cain . . . . . .
Third, James Comley . . . . . .
Marigolds. — Display of French and African, filling twenty-five vases, James Comley . . . . . .
Second, Charles H. Souther . . . . . .
Cannas. — Collection of not less than ten named varieties, in spikes, with foliage, James L. Little . . . . . .
Second, Walter H. Cowing . . . . . .
Third, James Farquhar . . . . . .
Fourth, Christian Johnson . . . . . .

DOUBLE ZINNIAS. — Twenty-five flowers, not less than six varieties, James Comley	4 00
Second, Frederick S. Davis	3 00
Third, Oakes Ames	2 00
DIANTHUSES. — Collection not exceeding forty bottles, of named species and varieties, one bottle of each, L. W. Goodell	3 00
NATIVE PLANTS. — Collection not exceeding forty bottles, of named species and varieties, one bottle of each, Mrs. P. D. Richards,	8 00
Second, Miss Genevieve Doran	6 00
Third, Misses Eleanor and Mollie Doran	4 00
VASE OF FLOWERS. — For table decoration, on the last day of the exhibition, Hattie B. Winter	4 00
Gratuities: —	
Oakes Ames, Collection of Aquatic Plants	12 00
Henry A. Dreer, Philadelphia, Penn., Collection of Aquatic Plants,	12 00
L. W. Goodell, Collection of Aquatic Plants	12 00
W. W. Rawson, Display of Dahlias	10 00
William C. Winter, Collection of Dahlias	2 00
T. C. Thurlow, Forty-three named varieties of Phlox	5 00
James Comley, Pyramid of Asters	4 00
L. W. Goodell, Phlox, Asters, and Salpiglossis	3 00
F. A. Blake, Asters	1 00
Norris R. Comley, Cockscombs	1 00
James L. Little, *Tydæa hybrida grandiflora*	1 00
A. B. Howard, Verbenas and Pompon Zinnias	1 00
James Comley, Display of Flowers	3 00
Bussey Institution, Flowers	1 00
John Jeffries, "	1 00
Mrs. E. M. Gill, "	1 00
Mrs. J. A. Cain, "	1 00

SEPTEMBER 12.

Gratuities: —	
John J. Colan, Cockscombs	2 00
John Parker, Dahlias	1 00
E. Sheppard, "	1 00
Mrs. E. M. Gill, Flowers	1 00

SEPTEMBER 19.

PERENNIAL ASTERS. — Display of native or introduced species and varieties, Mrs. P. D. Richards	5 00
Third, Misses Eleanor and Mollie Doran	3 00
Gratuities: —	
A. Lummus, Named Dahlias	2 00
John Jeffries, Coleus, Dahlias, etc.	2 00
J. Woodward Manning, Flowers	1 00
Mrs. E. M. Gill, "	1 00

OCTOBER 16.

Gratuity: —

Hon. John Simpkins, Display of Early Chrysanthemums . . .

OCTOBER 24.

Gratuities: —

James Comley, Chrysanthemums and Cosmos . . . . . .

Mrs. E. M. Gill, Chrysanthemums . . . . . .

OCTOBER 31.

Gratuities: —

Hon. John Simpkins, Two vases of Chrysanthemum, Mrs. Henry Robinson . . . . . .

James Comley, Display of Flowers . . . . . .

Hon. John Simpkins, New Seedling Chrysanthemum . . . .

CHRYSANTHEMUM SHOW.

NOVEMBER 10, 11, 12, AND 13.

Special Prize from the Josiah Bradlee Fund.

Twenty-five blooms, of twenty-five distinct varieties, named, Hon. John Simpkins, a piece of plate, or value in money . .

Second, Mrs. Benjamin P. Cheney . . . . . .

Third, Joseph H. White . . . . . .

Six vases, of six named varieties, ten blooms of each, Waban Conservatories . . . . . .

Second, Mrs. Benjamin P. Cheney . . . . . .

Third, J. W. Howard . . . . . .

Special Prizes offered by the Society.

Best Seedling, never disseminated, six blooms, Pink, J. Eaton, jr. .

Best Seedling, never disseminated, six blooms, White, J. Eaton, jr.,

Best Seedling, never disseminated, six blooms, any other color, Charles Souther . . . . . .

Best Seedling, never disseminated, six blooms Incurved, of any color, Joseph H. White, for Li Hung Chang . . . .

Regular Prizes.

Twelve blooms, Incurved, named, in vases, Joseph H. White . .

Second, John Jeffries . . . . . .

Twelve blooms, Japanese, named, in vases, Hon. John Simpkins .

Second, Joseph H. White . . . . . .

Third, William Slack . . . . . .

Twelve blooms, Japanese Incurved, named, in vases, John Simpkins	10 00
Second, Mrs. Benjamin P. Cheney	6 00
Third, Joseph H. White	4 00
Twelve blooms, Anemone, named, in vases, J. W. Howard	8 00
Second, James L. Little	6 00
Third, William Slack	4 00
Six blooms Incurved, named, in vases, Charles H. Souther	5 00
Second, Elisha S. Converse	4 00
Third, Joseph H. White	2 00
Six blooms, Japanese, named, in vases, Charles H. Souther	6 00
Third, Joseph H. White	2 00
Six blooms, Japanese Incurved, named, in vases, Charles H. Souther,	6 00
Second, Joseph H. White	4 00
Third, Mrs. Benjamin P. Cheney	2 00
Six blooms Reflexed, named, in vases, Joseph H. White	6 00
Second, Mrs. Benjamin P. Cheney	4 00
Third, Charles H. Souther	2 00
Six blooms, Anemone, named, in vases, Elisha S. Converse	5 00
Second, James L. Little	4 00
Third, William Slack	2 00
Twelve sprays, Pompons, not less than six named varieties, J. W. Howard	3 00
Second, William Slack	2 00
Twelve best varieties, named, introductions of the current year, Joseph H. White	8 00
Second, J. W. Howard	6 00
Vase of blooms on long stems, arranged in the Society's large china vases, to be kept in good condition during the exhibition, Hon. John Simpkins	20 00
Second, Hon. John Simpkins	18 00
Third, David Nevins	16 00
Fourth, Mrs. Benjamin P. Cheney	14 00
Fifth, Charles H. Souther	12 00
Sixth, J. W. Howard	10 00
Seventh, James Comley	8 00
Best vase of ten blooms on long stems, Pink, named, Mrs. Benjamin P. Cheney, for Viviand-Morel	10 00
Second, Mrs. Benjamin P. Cheney, for Mrs. Perin	8 00
Third, James L. Little, for Viviand-Morel	6 00
Best vase, ten blooms, on long stems, Red, named, Waban Conservatory, for Edwin Molyneux	10 00
Second, Mrs. Benjamin P. Cheney, for John Shrimpton	8 00
Third, James L. Little, for Egyptian	6 00
Best vase of ten blooms, on long stems, White, named, Waban Conservatories, for Mrs. Jerome Jones	10 00
Second, Mrs. Benjamin P. Cheney, for Mrs. W. H. Phipps	8 00
Third, James L. Little, for Mrs. Jerome Jones	6 00

Best vase of ten blooms, on long stems, Yellow, named, Waban Conservatories, for Eugene Dailledouze . . . .
Second, Mrs. Benjamin P. Cheney, for Major Bonnafon . .
Third, Mrs. Benjamin P. Cheney, for Eugene Dailledouze .
Best vase of ten blooms, on long stems, any other color, Mrs. Benjamin P. Cheney, for Mrs. George West . . . . .
Second, J. W. Howard, for Charles Davis . . . . .
Third, Elisha S. Converse, for Hicks Arnold . . . . .

Gratuities : —

Mrs. E. M. Gill, Chrysanthemums . . . . . .
William Nicholson, Chrysanthemums and Carnations . . .
John Jeffries, Display . . . . . .
James Comley, Chrysanthemums . . . . . .
Elisha S. Converse, Chrysanthemums . . . . . .
Hon. John Simpkins, two vases of Chrysanthemums . . .
Joseph H. White, Display of Chrysanthemums . . . . .
Norton Brothers, *Cattleya Bowringiana* . . . . . .
David Nevins, Violets' . . . . . .

NOVEMBER 21.

Gratuities : —

James Comley, Display of Flowers . . . . . .
Mrs. E. M. Gill, " " " . . . . . .

SOCIETY'S SILVER MEDALS.

June 13. Jackson Dawson, for Collection of New Seedling Roses, h of *Rosa multiflora*.
" " Jackson Dawson, for New Rose, cross between *Rosa Wichur* and General Jacqueminot.
Rose Show, June 23. John Jeffries, for Japanese Pæonies.
July 25. Botanic Garden of Harvard University, for Display of Herba Plants.
August 8. Botanic Garden of Harvard University, for Superior Coll of Annuals.
Chrysanthemum Show, November 10. Ernest Asmus, Hoboken, N. Rose Souvenir de Président Carnot.

APPLETON SILVER MEDAL.

Mrs. P. D. Richards, for Native Plants.

FIRST CLASS CERTIFICATES OF MERIT.

Rose Show, June 23. Oakes Ames, for Sweet Williams.
" " " " Hon. Joseph S. Fay, for Rose Lillian Nordica.

August 8. Rea Brothers, for *Rudbeckia laciniata* var. *Golden Glow.*
" " Jacob W. Manning, for *Rudbeckia laciniata* var. *Golden Glow.*
" " Henry A. Dreer, Philadelphia, Pa., for Nelumbium Shiroman.
" " Rev. W. T. Hutchins, for New Unnamed Sweet Pea.
Annual Exhibition of Flowers, September 2. Carl Blomberg, for New Nymphæa, Mrs. Anna C. Ames.
" " " " " " Miss Eliza Wellington, for Superior Cultivation of *Clianthus Dampieri.*
" " " " " " J. F. Huss, for *Pennisetum Ruppelii.*
Chrysanthemum Show, November 10. François Supiot, West Philadelphia, Pa., for Violet Luxonne.
" " " " François Supiot, for Violet Princess des Galles.

HONORABLE MENTION.

February 1. William C. Ward, for Carnation Meteor.
" " William C. Ward, for Carnation Bridesmaid.
June 13. Jackson Dawson, for Seedling Rose from Boston Belle.
June 27. Michael H. Walsh, for New Rose Joseph S. Fay.
August 8. Henry A. Dreer, for *Nymphæa O'Marana.*
Annual Exhibition of Flowers, September 2. James Comley, for New Perennial Pea.
Chrysanthemum Show, November 10. François Supiot, for Violet Admiral Avallon.

COMPLIMENTARY NOTICE.

May 23. R. & J. Farquhar & Co., for Canna Italia.
Chrysanthemum Show, November 10. John Breitmeyer & Sons, Detroit, Mich., for Seedling Chrysanthemum.

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1896.

By E. W. WOOD, CHAIRMAN.

The fruit exhibitions during the past season have been than usually irregular, and considerably below the averag recent years. Apples have been abundant and of excellent ity, exhibitors finding little difficulty in selecting perfect s mens. The Pear crop has been a partial failure.

At the Annual Exhibition there were no specimens noticeabl superior excellence. Very few Peaches of open culture have shown, and those were of inferior quality. Plums have shown in less quantity than usual. Some of the Japanese ties of this fruit which have received favorable notice have found to be more tender than the old kinds under general cu tion, and we would caution purchasers of the Japanese var against the danger of introducing the San José scale into gardens and orchards, as these trees have been sent out la from nurseries in New Jersey to other nurseries and growe over the country, and have been found to be seriously inf with this pest.

Small fruits were shown in about the usual quantity. Gr with the exception of the foreign varieties, were not up t standard either in the size of the bunches or in general ap ance. Among commercial growers the practice of girdlin vines is increasing, some asserting that if they could not secure the earlier ripening and larger bunches of more attra

appearance, they would give up the cultivation of this fruit, on account of the competition and low prices prevailing when the crop matures naturally and grapes are sent to this market in large quantities from locations outside the State. The practice of girdling is worthy of the attention of amateur growers, as by its application and by spraying the vines with the copper solutions or Bordeaux mixture the crosses with foreign varieties, which are more subject to mildew than pure natives, may be successfully grown. Girdling is not adapted to varieties having compact bunches, like Moore's Early and Delaware, as the increased size of the berries causes cracking and decay; but the value of the Concord and Worden, the two kinds of dark grapes most widely cultivated, may be increased by the operation.

Strawberries came through the winter in good condition, but set their fruit irregularly, some varieties being affected more than others and producing but a partial crop. At the Strawberry Exhibition some excellent fruit was shown, the Marshall easily taking the lead as an exhibition variety. This is the first season growers for market have given any considerable space to this variety, and the complaint was made that it did not prove as productive as some other kinds. Possibly the peculiarity of the season had something to do with this result, but its large size, superior quality, and fine appearance will make it desirable for the garden, and further experience may make it profitable for the commercial grower. It evidently requires rich soil and high cultivation to secure satisfactory results.

The public showed a growing interest in the exhibitions throughout the season by an increased attendance; these exhibitions afford those interested in fruit growing the best opportunity to learn by comparison the most desirable varieties for cultivation.

The prices received by fruit growers for their product has been, like the crop, unusually irregular. As a result of the over supply of apples for the home market, a larger quantity has been sent to foreign ports than in any previous year, and the returns from the earlier shipments were often unsatisfactory. Pears, owing to the short crop, brought higher prices than have prevailed in recent years. The small fruits brought fair prices and met with a ready sale.

George W. Campbell, Delaware, O., has entered his new grape, Campbell's Early, for the Special Prize offered from the Benjamin

B. Davis Fund, sending samples of the fruit in August, ber, and October.

Although the Committee offered in prizes $136 more th appropriation, owing to the partial failure in several lines they have awarded in prizes and gratuities only $1,527, le unexpended balance of $273.

E. W. Wood,
C. F. Curtis,
Samuel Hartwell,
Warren Fenno, } *Com*

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1896.

February 1.

Gratuity: —

Leverett M. Chase, Anjou Pears $1 00

March 7.

Gratuity: —

Charles H. Hovey, Pasadena, Cal., Navel Oranges 3 00

SPRING EXHIBITION.

March 24, 25, 26, and 27.

Winter Apples. — Baldwin, J. V. Fletcher 3 00
Second, Samuel Hartwell 2 00
Third, Marshall W. Chadbourne 1 00
Northern Spy, George V. Fletcher 3 00
Second, William T. Hall 2 00
Third, Samuel Hartwell 1 00
Roxbury Russet, George H. Dickerman 3 00
Second, Joshua C. Stone 2 00
Third, Benjamin P. Ware 1 00
Any other variety, George V. Fletcher, Rhode Island Greening . . 3 00
Second, M. W. Chadbourne, Hubbardston 2 00
Third, Samuel Hartwell, Blue Pearmain 1 00
Winter Pears. — Any variety, George V. Fletcher, Dana's Hovey, 3 00
Second, Leverett M. Chase, Anjou 2 00

Gratuities: —

Charles H. Hovey, Pasadena, Cal., Oranges and Lemons . . 3 00
B. K. Bliss, Navel Oranges 2 00

June 4.

Gratuities: —

James Comley, Peaches 3 00
William H. Hunt, Strawberries 1 00
William C. Winter, Grapes 1 00

June 13.

Gratuities: —

James Comley, Peaches 2 00
Hon. Joseph S. Fay, Marshall Strawberries 2 00
Charles S. Smith, Bubach Strawberries 1 00
William G. Prescott, Strawberries 2 00
William Doran & Son, Collection of Strawberries 2 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 23 AND 24.

Special Prizes from the Theodore Lyman Fund.

STRAWBERRIES. — For the best four quarts of any variety, Warren Heustis & Son, for Marshall, the Lyman Plate, value . .
Second, Marshall F. Ewell, for Marshall, the Lyman Plate, value
Third, Hon. Joseph S. Fay, " " " "
Fourth, Barnard Farm, " " " "
Fifth, Sumner Coolidge, " " " "

Special Prizes offered by the Society.

For the best two quarts of any variety, to be judged by points, Marshall F. Ewell, Marshall . . . . . .
Second, Hon. Joseph S. Fay, Marshall . . . . . .
Third, Warren Heustis & Son, Marshall . . . . . .
Fourth, Sumner Coolidge, Marshall . . . . . .

Regular Prizes.

For the largest and best collection, not less than twenty baskets of two quarts each, and not less than five varieties, George F. Wheeler . . . . . .
Ten baskets, not less than three varieties, two quarts each, George F. Wheeler . . . . . .
Second, George V. Fletcher . . . . . .
Third, Isaac E. Coburn . . . . . .
Five baskets, of one variety, two quarts each, Marshall F. Ewell .
Second, Warren Heustis & Son . . . . . .
Third, George F. Wheeler . . . . . .
Fourth, Samuel Hartwell . . . . . .
Fifth, W. D. Hinds . . . . . .
Two quarts of Belmont, George V. Fletcher . . . . . .
Second, Barnard Farm . . . . . .
Third, Samuel Hartwell . . . . . .
Bubach, Sumner Coolidge . . . . . .
Second, Oliver R. Robbins . . . . . .
Third, George F. Wheeler . . . . . .
Champion, Barnard Farm . . . . . .
Second, George F. Wheeler . . . . . .
Third, Bordman Kenrick . . . . . .
Charles Downing, Miss Mary S. Walker . . . . . .
Second, Samuel Hartwell . . . . . .
Third, William Doran & Son . . . . . .
Crescent, the second prize to Isaac E. Coburn . . . . .

Haverland, William Doran & Son	4 00
Second, Isaac E. Coburn	3 00
Third, George F. Wheeler	2 00
Hersey, George F. Wheeler	4 00
Second, William G. Prescott	3 00
Jessie, George V. Fletcher	4 00
Second, Isaac E. Coburn	3 00
Third, George F. Wheeler	2 00
Leader, George F. Wheeler	4 00
Second, Samuel Wheeler	3 00
Third, Isaac E. Coburn	2 00
Marshall, Marshall F. Ewell	4 00
Second, Hon. Joseph S. Fay	3 00
Third, Warren Heustis & Son	2 00
Miner's Prolific, George F. Wheeler	4 00
Parker Earle, George F. Wheeler	4 00
Sharpless, Samuel Hartwell	4 00
Any other variety, Barnard Farm, Timbrell	4 00
Second, J. D. Gowing, Seedling	3 00
Third, Elliot Moore	2 00
Collection, not less than six varieties, one quart of each, Sumner Coolidge	8 00
Second, George F. Wheeler	6 00
One quart of any new variety not previously exhibited, J. D. Gowing, Seedling	3 00
Second, A. R. Howard, Seedling	2 00
CHERRIES. — Two quarts of any variety, Edwin Hastings	4 00
Second, George V. Fletcher	3 00
Third, Charles S. Smith	2 00
FOREIGN GRAPES. — Two bunches of any variety, Elisha S. Converse	6 00
Second, Elisha S. Converse	4 00
FORCED PEACHES. — Six specimens of any variety, James Comley, Stephenson	3 00
Second, William C. Winter, Amsden	2 00
Gratuity : —	
James Comley, Peaches	2 00

JUNE 27.

STRAWBERRIES. — One quart of any variety, Marshall F. Ewell, Marshall	3 00
Second, Warren Heustis & Son, Marshall	2 00
Third, Hon. Joseph S. Fay, Marshall	1 00
CHERRIES. — Two quarts of Black Eagle, Samuel G. Damon	3 00
Two quarts of Downer's Late, M. W. Chadbourne	3 00
Any other variety, the second prize to E. S. Chapell, Napoleon	2 00
Third, Wilfred Wheeler, Richmond	1 00

JULY 11.

RASPBERRIES. — Two quarts of any variety, William Doran & S
Red Antwerp . . . . . .
Second, Elisha S. Converse . . . . . .
CURRANTS. — Two quarts of any Red variety, Sumner Coolid
Fay's . . . . . .
Second, William Doran & Son, Fay's . . . . .
Third, Samuel G. Damon, Versaillaise . . . . .
Fourth, Benjamin G. Smith, Versaillaise . . . . .
Two quarts of any White variety, Nathaniel T. Kidder, Wh
Grape . . . . . .
Second, Elisha S. Converse, White Grape . . . . .
Third, Benjamin G. Smith, Dana's New White . . . .
GOOSEBERRIES. — Two quarts of any Native variety, Joseph
Chase, Triumph . . . . . .
Second, Dr. Walter G. Kendall, Columbus . . . . .
Third, Warren Heustis & Son, Downing . . . . .

Gratuities: —
William C. Winter, Foreign Grapes . . . . . .
Robert Manning, Florence Cherries . . . . . .
E. S. Chapell, Napoleon Cherries . . . . . .
James Comley, Peaches . . . . . .

JULY 18.

RASPBERRIES. — Two quarts of any variety, Mrs. E. J. Cutt
Cuthbert . . . . . .
Second, Benjamin G. Smith, Knevett's Giant . . . .
Third, Elisha S. Converse, Cuthbert . . . . . .
CURRANTS. — One quart of any Red variety, William Doran & So
Versaillaise . . . . . .
Second, Sumner Coolidge, Fay's . . . . . .
Third, Samuel J. Trepess, Versaillaise . . . . .
One quart of any White variety, Samuel J. Trepess, White Grap
Second, Elisha S. Converse, White Grape . . . .
GOOSEBERRIES. — Two quarts of any Foreign variety, Benjamin
Smith, Hero of the Nile . . . . . .
Second, Benjamin P. Ware, English Fancy . . . .
Third, Benjamin G. Smith, Abbotsford . . . . .

Gratuity: —
Warren Heustis & Son, Collection . . . . . .

JULY 25.

BLACKBERRIES. — Two quarts of any variety, Rev. Calvin Terr
Dorchester . . . . . .
Second, Rev. Calvin Terry, Kittatinny . . . . .

Apples. — Tetofsky, George Nelson	3 00
Second, James Comley	2 00
Third, David L. Fiske	1 00
Pears. — Summer Doyenne, Sumner Coolidge	3 00
Second, Elisha S. Converse	2 00
Third, David L. Fiske	1 00
Peaches. — Six of any variety, William C. Winter	3 00
Gratuity : —	
Mrs. E. J. Cutter, Raspberries	1 00

August 1.

Apples. — Red Astrachan, Samuel Hartwell	3 00
Second, Samuel G. Damon	2 00
Third, Charles F. Curtis	1 00
Sweet Bough, George V. Fletcher	3 00
Second, Charles B. Travis	2 00
Third, Sumner Coolidge	1 00
Any other variety, A. M. Knowlton, Yellow Transparent	3 00
Second, George Nelson, Yellow Transparent	2 00
Third, C. C. Shaw, Early Harvest	1 00
Pears. — Giffard, A. T. Brown	3 00
Second, Mrs. Emmons	2 00
Third, Samuel G. Damon	1 00
Any other variety, Sumner Coolidge	3 00
Second, A. T. Brown	2 00
Third, Mrs. S. Klaus	1 00
Blackberries. — Two quarts of any variety, M. W. Chadbourne	3 00
Second, E. W. Wood	2 00
Third, Sumner Coolidge	1 00
Gratuity : —	
James Comley, Collection of Apples	1 00

August 8.

Apples. — Oldenburg, George C. Rice	3 00
Second, E. R. Cook	2 00
Third, J. V. Fletcher	1 00
Any other variety, Luke Tuttle, Red Astrachan	3 00
Second, Charles B. Travis, Sweet Bough	2 00
Third, Samuel Hartwell, Summer Pippin	1 00
Pears. — Clapp's Favorite, Sumner Coolidge	3 00
Second, George V. Fletcher	2 00
Third, Mrs. S. Klaus	1 00
Any other variety, the second prize to Samuel G. Damon, Giffard	2 00
Third, Mrs. Emmons, Giffard	1 00

PEACHES. — Six specimens of cold house or pot culture, of
variety, Elisha S. Converse . . . . . .
Second, William C. Winter . . . . . .
FOREIGN GRAPES. — Two bunches of any variety, Elisha S. C
verse, Foster's Seedling . . . . . .
Second, Elisha S. Converse, Black Hamburg . . .

AUGUST 15.

APPLES. — Chenango, Sumner Coolidge . . . . .
Second, Charles F. Curtis . . . . . .
Third, P. G. Hanson . . . . . .
Williams, Joshua C. Stone . . . . . .
Second, Charles F. Curtis . . . . . .
Third, Elisha S. Converse . . . . . .
Any other variety, Samuel Hartwell, Summer Pippin . .
Second, Samuel Hartwell, Gravenstein . . . .
Third, Samuel Hartwell, Bietigheimer . . . .
PEARS. — Rostiezer, Elisha S. Converse . . . . .
Second, M. W. Chadbourne . . . . . .
Third, S. F. & F. L. Weston . . . . . .
Tyson, John L. Bird . . . . . .
Second, Warren Fenno . . . . . .
Third, Leverett M. Chase . . . . . .
Any other variety, Sumner Coolidge, Clapp's Favorite . .
Second, Mrs. S. Klaus, Clapp's Favorite . . . .
Third, A. T. Brown, Bartlett . . . . . .
PLUMS. — Any variety, George V. Fletcher, Bradshaw . .
Second, E. R. Cook, Greeley . . . . . .
Third, Rev. Calvin Terry, Columbia . . . . .

AUGUST 22.

APPLES. — Foundling, Samuel Hartwell . . . . .
Gravenstein, David L. Fiske . . . . . .
Second, E. W. Fiske . . . . . .
Third, Samuel Hartwell . . . . . .
Maiden's Blush, E. R. Cook . . . . . .
Second, Joshua C. Stone . . . . . .
Third, Dr. Walter G. Kendall . . . . . .
Porter, George V. Fletcher . . . . . .
Second, Samuel G. Damon . . . . . .
Third, Sumner Coolidge . . . . . .
Summer Pippin, Samuel Hartwell . . . . . .
Second, Warren Fenno . . . . . .
Any other variety, O. B. Hadwen, Somerset . . . . .
Second, Samuel Hartwell, Bietigheimer . . . .
Third, Joshua C. Stone, Williams . . . . .

PEARS. — Andrews, Elisha S. Converse 3 00
Second, Joshua C. Stone 2 00
Bartlett, Mrs. S. Klaus 3 00
Second, Sumner Coolidge 2 00
Third, Samuel G. Damon 1 00
Souvenir du Congrès, Warren Fenno 3 00
Second, Samuel Hartwell 2 00
Any other variety, H. K. W. Hall, Clapp's Favorite . . . 3 00
Second, Mrs. S. Klaus, Clapp's Favorite 2 00
Third, A. T. Brown, Flemish Beauty 1 00
PLUMS. — Bradshaw, George V. Fletcher 3 00
Second, William H. Hunt 2 00
Third, L. W. Goodell 1 00
Any other variety, E. R. Cook, Jefferson 3 00
Second, David L. Fiske, Seedling 2 00
Third, Rev. Calvin Terry, Columbia 1 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 2 AND 3.

FOREIGN GRAPES. — Four varieties, two bunches each, Mrs. J. W. Clark, Pomfret, Conn. 10 00
Second, Elisha S. Converse 8 00
Two bunches of Black Alicante, Mrs. J. W. Clark . . . 5 00
Second, Elisha S. Converse 4 00
Two bunches of Black Hamburg, Mrs. J. W. Clark . . . 5 00
Second, Joseph H. White 4 00
Two bunches of Golden Hamburg, Mrs. J. W. Clark . . . 5 00
Two bunches of Muscat of Alexandria, Mrs. J. W. Clark . . 5 00
Second, Joseph H. White 4 00

SEPTEMBER 12.

APPLES. — Foundling, C. M. Handley 3 00
Second, Samuel Hartwell 2 00
Third, W. H. Teele 1 00
Garden Royal, C. M. Handley 3 00
Third, Benjamin G. Smith 1 00
Gravenstein, Samuel Hartwell 3 00
Second, David L. Fiske 2 00
Third, George V. Fletcher 1 00
Maiden's Blush, H. R. Kinney 3 00
Second, Orlendo W. Dimick 2 00
Third, Joshua C. Stone 1 00

Porter, C. M. Handley
Second, George V. Fletcher
Third, F. J. Kinney
Pumpkin Sweet, Samuel Hartwell
Second, George W. Stevens
Third, Samuel G. Damon
Any other variety, L. J. Fosdick, Seedling
Second, C. M. Handley, Wealthy
Third, C. M. Handley, Fall Orange or Holden
CRAB APPLES. — Transcendent, L. J. Fosdick
Second, George W. Stevens
Any other variety, Orlendo W. Dimick
Second, Joshua C. Stone
PEARS. — Bartlett, George V. Fletcher
Second, Sumner Coolidge
Third, Charles F. Curtis
Belle Lucrative, Elisha S. Converse
Second, A. T. Brown
Boussock, Charles F. Curtis
Second, Elmer E. Chipman
Third, David L. Fiske
Hardy, David L. Fiske
Second, Warren Fenno
Paradise of Autumn, William Milman
Second, David L. Fiske
Third, Warren Fenno
Any other variety, William Milman, Seckel
Second, A. T. Brown, Seckel
Third, Warren Fenno, Adams
PLUMS. — Imperial Gage, George V. Fletcher
Second, William H. Hunt
Third, Mrs. M. T. Goddard
Lombard, John L. Bird
Second, Mrs. S. Klaus
Third, Mrs. Mary T. Goddard
Any other variety, Mrs. Mary T. Goddard, Pond's Seedling
Second, Mrs. Mary T. Goddard, Golden Egg
Third, William H. Hunt, Pond's Seedling
NATIVE GRAPES. — Six bunches of Eumelan, Benjamin G. Smith
Six bunches of Massasoit, F. J. Kinney
Second, Benjamin G. Smith
Third, Samuel G. Damon
Six bunches of Moore's Early, Oliver R. Robbins
Second, Samuel G. Damon
Third, George W. Jameson
Six bunches of any other variety, Joseph S. Chase, Delaware
Second, F. J. Kinney, Worden
Third, Joseph S. Chase, Ulster Prolific

Six bunches of any variety from girdled vines, F. J. Kinney, Worden 3 00
Second, F. J. Kinney, Concord 2 00
FIGS. — Any variety, William McRoberts 2 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

OCTOBER 1 AND 2.

Special Prizes.

Samuel Appleton Fund.

APPLES. — Baldwin, Joshua C. Stone 5 00
Hubbardston, C. M. Handley 5 00
PEARS. — Sheldon, Samuel G. Damon 5 00

Benjamin V. French Fund.

APPLES. — Gravenstein, Samuel Hartwell 5 00
Rhode Island Greening, Henry E. Rich 5 00

Marshall P. Wilder Fund.

PEARS. — Anjou, Mrs. S. Klaus 4 00
Second, David L. Fiske 3 00
Third, Samuel Hartwell 2 00
Fourth, A. T. Brown 1 00
Bartlett, George V. Fletcher 4 00
Second, Samuel G. Damon 3 00
GRAPES. — Twelve bunches of Concord, George W. Jameson . 4 00
Second, F. J. Kinney 3 00
Third, William Doran & Son 2 00
Fourth, John Parker 1 00
Twelve bunches of Worden, F. J. Kinney 4 00
Second, Samuel Hartwell 3 00
Third, H. R. Kinney 2 00
Fourth, William C. Winter 1 00

Special Prizes offered by the Society.

PEARS. — Anjou, Samuel G. Damon 5 00
Seckel, Samuel Hartwell 5 00
NATIVE GRAPES. — Twelve bunches of any variety, Joseph S. Chase 5 00

Regular Prizes, Theodore Lyman Fund.

APPLES. — Baldwin, Henry E. Rich 4 00
Second, John W. Clark 3 00
Third, A. M. Knowlton 2 00

Dutch Codlin, Warren Fenno
Fall Orange or Holden, C. M. Handley
Second, H. R. Kinney
Third, Henry E. Rich
Fameuse, George V. Fletcher
Second, Benjamin G. Smith
Third, Mrs. C. N. S. Horner
Fletcher Russet, William H. Teele
Second, Charles F. Curtis
Third, George V. Fletcher
Foundling, C. M. Handley
Second, Samuel Hartwell
Gloria Mundi, Samuel Hartwell
Second, E. R. Cook
Golden Russet, Henry E. Rich
Second, Mrs. Mary T. Goddard
Gravenstein, George V. Fletcher
Second, Samuel Hartwell
Third, C. C. Shaw
Hubbardston, C. B. Lancaster
Second, Joshua C. Stone
Third, C. M. Handley
Hunt Russet, William H. Teele
Second, William H. Hunt
Third, Samuel Hartwell
Jacobs Sweet, Charles F. Curtis
Lady's Sweet, A. M. Knowlton
Second, William H. Teele
Mackintosh, George C. Rice
Second, Samuel Hartwell
Third, E. C. Stone
Maiden's Blush, H. R. Kinney
Second, Joshua C. Stone
Mother, David L. Fiske
Second, H. R. Kinney
Third, William H. Teele
Northern Spy, George V. Fletcher
Second, George C. Rice
Third, C. C. Shaw
Porter, George V. Fletcher
Second, C. M. Handley
Third, P. G. Hanson
Pound Sweet, George V. Fletcher
Second, George C. Rice
Third, Samuel Hartwell
Rhode Island Greening, Joshua C. Stone
Second, Elliott Moore
Third, George C. Rice

Roxbury Russet, Nathaniel T. Kidder	4 00
Second, J. A. Leonard	3 00
Third, E. R. Cook	2 00
Sutton, George Cruickshanks	3 00
Second, George C. Rice	2 00
Third, Henry E. Rich	1 00
Tolman's Sweet, Willard P. Plimpton	3 00
Second, George C. Rice	2 00
Third, C. C. Shaw	1 00
Tompkins King, George C. Rice	3 00
Second, F. J. Kinney	2 00
Third, John W. Clark	1 00
Washington Royal, or Palmer, O. B. Hadwen	3 00
Second, George Cruickshanks	2 00
Third, George C. Rice	1 00
Wealthy, C. M. Handley	3 00
Second, W. K. W. Hall	2 00
Third, George C. Rice	1 00
Any other variety, O. B. Hadwen, Bowen	3 00
Second, A. J. Moody	2 00
Third, John Parker	1 00
Crab Apples. — Hyslop, M. W. Chadbourne	2 00
Second, Norris R. Comley	1 00
Any other variety, S. Warren	2 00
Second, S. F. & F. L. Weston	1 00

Society's Prizes.

Pears. — Angouleme, A. T. Brown	4 00
Second, Samuel G. Damon	3 00
Third, Mrs. Emmons	2 00
Fourth, Warren Fenno	1 00
Bosc, Sumner Coolidge	4 00
Second, Warren Fenno	3 00
Third, A. T. Brown	2 00
Fourth, Arthur Coolidge	1 00
Clairgeau, William T. Hall	3 00
Second, Samuel G. Damon	2 00
Third, Warren Fenno	1 00
Comice, A. T. Brown	3 00
Second, Warren Fenno	2 00
Third, Leverett M. Chase	1 00
Dana's Hovey, A. T. Brown	4 00
Second, Samuel G. Damon	3 00
Third, Willard P. Plimpton	2 00
Fourth, Charles E. Swain	1 00
Diel, Charles E. Swain	3 00
Second, Benjamin G. Smith	2 00
Third, J. R. Magullion	1 00

Fulton, Elisha S. Converse
Second, John L. Bird.
Hardy, Warren Fenno.
Howell, Benjamin G. Smith
Second, Warren Fenno
Third, George F. Wheeler.
Josephine of Malines, Warren Fenno
Second, John L. Bird
Third, L. W. Goodell
Lawrence, A. T. Brown
Second, Leverett M. Chase
Third, Warren Fenno
Louise Bonne of Jersey, Sumner Coolidge
Second, Warren Fenno
Third, Benjamin G. Smith.
Marie Louise, Charles E. Swain
Second, Mr. Jones
Third, Warren Fenno
Merriam, Sumner Coolidge
Second, Samuel G. Damon
Third, A. T. Brown
Seckel, Charles F. Curtis
Second, Charles E. Swain
Third, A. T. Brown
Fourth, Mrs. S. Klaus
Sheldon, A. T. Brown
Second, Sumner Coolidge
Third, Samuel G. Damon
Fourth, William Milman
St. Michael Archangel, Warren Heustis & Son
Second, Benjamin G. Smith
Third, Warren Fenno
Superfin, Sumner Coolidge
Second, Warren Fenno
Urbaniste, A. T. Brown
Second, Charles E. Swain
Third, Mrs. Emmons
Vicar, A. T. Brown
Second, Mrs. Jones
Third, Sumner Coolidge
Winter Nelis, A. T. Brown
Second, Mrs. Emmons
Third, Clifford Weld
Any other variety, Charles B. Travis, Onondaga
Second, Warren Fenno, "
Third, John J. Merrill, "

Quinces. — Champion, Charles S. Smith	3 00
Second, Orlendo W. Dimick	2 00
Third, George V. Fletcher	1 00
Orange, J. E. Richardson	3 00
Second, George V. Fletcher	2 00
Third, Arthur F. Coolidge	1 00
Pear, E. R. Cook	3 00
Second, George V. Fletcher	2 00
Third, Benjamin G. Smith	1 00
Rea, Mrs. Mary T. Goddard	3 00
Second, George S. Curtis	2 00
Third, Benjamin G. Smith	1 00
Peaches, Orchard House Culture. — William C. Winter	4 00
Plums. — Yellow Egg, George V. Fletcher	2 00
Any other variety, Samuel G. Damon	2 00
Second, George V. Fletcher	1 00
Native Grapes. — Six bunches of Brighton, Samuel Hartwell	3 00
Second, Benjamin G. Smith	2 00
Third, M. W. Chadbourne	1 00
Delaware, Joseph S. Chase	4 00
Second, Samuel G. Damon	3 00
Third, Benjamin G. Smith	2 00
Fourth, Samuel Hartwell	1 00
Herbert, Samuel G. Damon	3 00
Second, Joseph S. Chase	2 00
Iona, Samuel G. Damon	3 00
Second, Joseph S. Chase	2 00
Third, Francis Blake	1 00
Lindley, Benjamin G. Smith	3 00
Second, Samuel G. Damon	2 00
Niagara, Oliver R. Robbins	3 00
Second, Samuel G. Damon	2 00
Third, Joseph S. Chase	1 00
Pocklington, Mrs. J. H. Jackman	4 00
Second, Samuel Hartwell	3 00
Third, P. G. Hanson	2 00
Fourth, S. F. & F. L. Weston	1 00
Prentiss, Benjamin G. Smith	3 00
Second, Joseph S. Chase	2 00
Wilder, Benjamin G. Smith	3 00
Second, Samuel G. Damon	2 00
Any other variety, Mrs. M. Haller, Salem	3 00
Second, Benjamin G. Smith, Merrimack	2 00
Third, F. J. Kinney, Salem	1 00
Concord from girdled vines, F. J. Kinney	3 00
Second, H. R. Kinney	2 00

CRANBERRIES. — Half-peck, L. J. Fosdick
Second, L. J. Fosdick
Third, L. J. Fosdick

Gratuities: —

Benjamin G. Smith, Display of Grapes
Warren Fenno, Collection

EXHIBITION OF WINTER FRUITS AND VEGETA

NOVEMBER 21.

Benjamin V. French Fund.

APPLES. — Baldwin, John W. Clark
Hubbardston, C. M. Handley

Society's Prizes.

APPLES. — Baldwin, William Doran & Son
Second, J. V. Fletcher
Third, M. W. Chadbourne
Danvers Sweet, Warren Fenno
Second, C. M. Handley
Fletcher Russet, Charles F. Curtis
Second, George V. Fletcher
Third, William H. Teele
Hubbardston, Amos T. Leavitt
Second, C. M. Handley
Third, M. W. Chadbourne
Hunt Russet, Samuel Hartwell
Lady's Sweet, A. M. Knowlton
Northern Spy, George V. Fletcher
Second, Littlefield Farm
Third, William Doran & Son
Rhode Island Greening, George V. Fletcher
Second, J. W. Clark
Third, E. W. Wood
Roxbury Russet, George C. Rice
Second, George V. Fletcher
Third, Samuel Hartwell
Tolman's Sweet, Mrs. Sarah M. Moore
Second, George C. Rice
Third, Willard P. Plimpton
Tompkins King, George C. Rice
Second, Samuel Hartwell
Third, E. C. Stone

Any other variety, George C. Rice, Mackintosh	3 00
Second, George C. Rice, Yellow Bellflower	2 00
Third, George V. Fletcher, Pound Sweet	1 00
Pears. — Angouleme, Samuel G. Damon	4 00
Second, A. T. Brown	3 00
Third, Mrs. Emmons	2 00
Fourth, Warren Fenno	1 00
Anjou, A. T. Brown	4 00
Second, Mrs. S. Klaus	3 00
Third, Charles E. Swain	2 00
Fourth, Samuel G. Damon	1 00
Clairgeau, William T. Hall	3 00
Second, Warren Fenno	2 00
Third, Samuel G. Damon	1 00
Comice, A. T. Brown	3 00
Dana's Hovey, A. T. Brown	4 00
Second, Samuel G. Damon	3 00
Third, Charles E. Swain	2 00
Fourth, Benjamin G. Smith	1 00
Diel, Charles E. Swain	3 00
Second, A. T. Brown	2 00
Third, Benjamin G. Smith	1 00
Glout Morceau, Warren Fenno	3 00
Second, Clifford Weld	2 00
Josephine of Malines, Warren Fenno	3 00
Second, John L. Bird	2 00
Langelier, A. T. Brown	3 00
Second, Mrs. S. Klaus	2 00
Third, T. M. Davis	1 00
Lawrence, A. T. Brown	3 00
Second, Warren Fenno	2 00
Third, Mrs. Emmons	1 00
Vicar, Mrs. Jones	3 00
Second, John J. Merrill	2 00
Third, A. T. Brown	1 00
Winter Nelis, A. T. Brown	3 00
Second, Mrs. Emmons	2 00
Third, Clifford Weld	1 00
Any other variety, Warren Fenno, Duchess of Bordeaux	3 00
Second, S. F. & F. L. Weston, Columbia	2 00
Third, Clifford Weld	1 00
Gratuities: —	
L. J. Fosdick, Cranberries	1 00
Rev. Calvin Terry, Cranberries	1 00

REPORT

OF THE

COMMITTEE ON VEGETABL

FOR THE YEAR 1896.

By CHARLES N. BRACKETT, CHAIRMAN.

The exhibition season for the year 1896 is just concl
a brief report of the doings of your Committee is now i

We are highly gratified to be able to report that our e
in this department the past year have shown an onward
which testifies more plainly than any other evidence cou
the progress which is being made in vegetable culture
satisfactory. In each and every class the state of pe
which the generality of exhibitors brought their variou
tions to the contest has been very good, and after m
allowance for the diversity of location and the effect
crops of the contingencies of the weather, we have
enough to satisfy us that intelligent minds are engaged
hands are at work in growing the various products of th
that high degree of luxuriance and perfection which th
union of art in aid of nature's efforts can alone effect. St
of our exhibitions has there been the least difficulty in de
marked difference between the well tended crop and its
nate competitor.

With a season favorable to vegetable growth, our wee
from the first Saturday in July to the Annual Exhibition,
unusually full and fine, and seemed to be thoroughly a
by the visiting public.

As usual, very good exhibits of forced vegetables

during the months of January and February. A. W. Crockford's Mushrooms, shown on several occasions during the winter, were remarkably fine and well grown specimens, deserving high commendation.

But few new vegetables were shown the past year requiring special mention. July 11 H. R. Kinney showed a new Pea under the name of Buck's New Life, a pea of the largest size, perfect in form and color, but lacking in quality. Of recent introduction, the Juno, a pea exhibited here last year for the first time, was shown July 25 by James Comley. While possessing all the points of the above mentioned variety, it can claim an additional and very important point; namely, quality. It is a pea of delicious flavor, and seemed to the Committee worthy of cultivation.

August 22 A. T. Brown exhibited a new and very large Tomato called Buckeye State. The specimens were well grown, but like most varieties of the largest size this will probably be found too late for profitable cultivation by the market gardener. On the same date a novelty in the way of a new Tomato with variegated foliage was shown by L. W. Goodell.

At this show the Boston Mycological Club made the largest display of the season, about 150 varieties of Fungi. Hollis Webster was the largest contributor, taking the first prize at this and subsequent prize days during the season. We note the continuance of the lively interest mentioned in last year's report in these exhibitions of our Native Mushrooms, both by members and visitors.

Your Committee are of the opinion that prizes should be offered for only known, named, edible varieties, and that such exhibits should be shown separately, and not mixed up on the same table with poisonous or doubtful varieties. Shown in this manner, they would become object lessons to the student of this subject, who would soon learn to know them at sight.

At a recent meeting of the Society the following vote was passed with reference to these exhibits in future, to which the attention of those interested is called:

"Voted, That the Vegetable Committee be requested to provide cards distinctively colored (red or otherwise), and having the word 'Poisonous' plainly printed thereon, and that exhibitors of Fungi not known to be edible be required to use these cards in labelling all such exhibits when shown in Horticultural Hall."

September 12, the last of the weekly exhibitions, was the largest and one of the best of the season. Nearly all t were competed for and awarded.

The display of Potatoes at the Annual Exhibition fo usual one of the most interesting features of this show, th being great (ninety-five dishes were shown) and the qu surpassed. C. H. Thomas again took the first prize for four varieties. Celery, Cauliflowers, Tomatoes, Squash Plants, etc., were also most richly represented.

The various root crops are deserving of special mentio have never seen finer or more perfect specimens of the varieties of Beets, Carrots, Parsnips, and Turnips than we at this exhibition. We are pleased to bear testimony Kinney's skill as a grower of fine vegetables, as manifest very fine specimens which on several occasions gained fo first premium. He also secured the first prize at this e for the best collection of vegetables arranged for effect.

The display of Tomatoes, consisting of sixty dishes, standard kinds, was, owing to the lateness of the sea equal to that made on September 12. The first prize for three varieties was awarded to E. C. Lewis. Hon. Aa was the largest contributor, showing some twenty varieties.

Competition for prizes the past year has been unusua and spirited, and the Committee in making the awards dom had their powers of discrimination so thoroughly tes

The amount appropriated for the year 1896 was . . $
The Committee have awarded in prizes and gratuities .

Leaving an unexpended balance of . . .

All of which is respectfully submitted.

For the Committee,

C. N. Brackett, *Cha*

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1896.

January 11.

Radishes. — Four bunches of any variety, Arthur F. Coolidge	$3 00
Cucumbers. — Pair of any variety, Francis Blake	3 00
Second, Arthur F. Coolidge	2 00
Third, Francis Blake	1 00
Cauliflowers. — Four specimens, William H. Teele	3 00
Lettuce. — Four heads of Tennisball, Joshua C. Stone	3 00
Second, Arthur F. Coolidge	2 00
Third, H. R. Kinney	1 00
Parsley. — Two quarts, David Nevins	2 00
Second, W. N. Craig	1 00
Mushrooms. — Twenty-four specimens, A. W. Crockford	3 00
Second, Elisha S. Converse	2 00
Tomatoes. — Twelve specimens, William C. Winter, Chemin	3 00
Second, W. N. Craig, May's Favorite	2 00
Third, William C. Winter, Essex	1 00
Gratuities : —	
Warren Heustis & Son, Celery	1 00
A. W. Crockford, Mushrooms	1 00

February 1.

Radishes. — Four bunches of any variety, Joshua C. Stone	2 00
Cucumbers. — Pair of any variety, Francis Blake	3 00
Dandelions. — Peck, David Nevins	3 00
Second, William C. Winter	2 00
Lettuce. — Four heads of Tennisball, Joshua C. Stone	3 00
Mushrooms. — Twenty-four specimens, A. W. Crockford	3 00
Rhubarb. — Twelve stalks, C. F. Smith	3 00
Second, George Sanderson	2 00
Third, Norris R. Comley	1 00
Tomatoes. — Twelve specimens, Francis Blake	3 00
Second, William C. Winter, President Cleveland	2 00
Third, William C. Winter, Chemin	1 00
Gratuity : —	
Norris R Comley, Rhubarb	1 00

FEBRUARY 8.

Gratuities : —

M. Ernest Moore, Lettuce . . . . . .
Norris R. Comley, Rhubarb . . . . . .
George Seaverns, Tomatoes . . . . . .

FEBRUARY 15.

Gratuity : —

Norris R. Comley, Rhubarb . . . . . .

FEBRUARY 29.

Gratuities : —

Warren Heustis & Son, Dandelions . . . . . .
Rev. Calvin Terry, Canada Squashes . . . . .

SPRING EXHIBITION.

MARCH 24, 25, 26, AND 27.

RADISHES. — Four bunches of Turnip Rooted, Joshua C. Stone
Second, A. W. Crockford . . . . . .
CUCUMBERS. — Pair of White Spine, M. D. Hawes . . .
Second, M. Ernest Moore . . . . . .
Third, Francis Blake . . . . . .
DANDELIONS. — Peck, Warren Heustis & Son . . . .
Second, Arthur F. Coolidge . . . . . .
Third, Hon. Aaron Low . . . . . .
LETTUCE. — Four heads of Tennisball, John L. Gardner . .
Second, Arthur F. Coolidge . . . . . .
Third, Joshua C. Stone . . . . . .
WATER CRESS. — Two quarts, Benjamin P. Ware . . . .
PARSLEY. — Two quarts, David Nevins . . . . . .
Second, Arthur F. Coolidge . . . . . .
MUSHROOMS. — Twenty-four specimens, A. W. Crockford .
RHUBARB. — Twelve stalks, the second prize to George Sanderson
TOMATOES. — Twelve specimens, Francis Blake, Essex . .
Second, Francis Blake, Nicholson . . . . . .
Third, William Nicholson, Nicholson . . . . .

Gratuities : —

Ettore Tassinari, Onions . . . . . .
Rev. Calvin Terry, Potatoes . . . . . .
M. W. Chadbourne, Artichokes . . . . . .
Warren Heustis & Son, Dandelions . . . . . .
Arthur F. Coolidge, Collection . . . . . .

APRIL 4.

CUCUMBERS. — Pair of White Spine, M. Ernest Moore	3 00
Second, Francis Blake	2 00
Third, James Comley	1 00
Gratuities: —	
Hon. Aaron Low, twenty varieties of Potatoes	3 00
M. Ernest Moore, Lettuce	1 00
Warren Heustis & Son, Beet Greens	1 00

APRIL 11.

Gratuities: —	
William Nicholson, Tomatoes	1 00
Warren Heustis & Son, Dandelions	1 00
James Comley, Cucumbers	1 00

APRIL 17.

Gratuities: —	
James Comley, Cucumbers	1 00
Warren Heustis & Son, Dandelions	1 00

MAY EXHIBITION.

MAY 2.

ASPARAGUS. — Four bunches, twelve stalks each, L. W. Weston	3 00
Second, Hon. George Heywood	2 00
CUCUMBERS. — Pair of White Spine, M. Ernest Moore	3 00
Second, M. D. Hawes	2 00
Third, Arthur F. Coolidge	1 00
SPINACH. — Peck, Arthur F. Coolidge	3 00
DANDELIONS. — Peck, M. Ernest Moore	2 00
Second, Hon. Aaron Low	1 00
LETTUCE. — Four heads, M. E. Moore	3 00
Second, Arthur F. Coolidge	2 00
RHUBARB. — Twelve stalks, P. G. Hanson	2 00
Second, George Sanderson	1 00
Gratuities: —	
W. N. Craig, Collection	3 00
William Nicholson, Tomatoes	1 00

MAY 9.

Gratuities: —	
Hon. George Heywood, Asparagus	1 00
L. W. Weston, Asparagus	1 00
P. G. Hanson, Collection	2 00
Warren Heustis & Son, Collection	1 00

MAY 16.

Gratuities : —

P. G. Hanson, Asparagus and Rhubarb . . . .
Mrs. Mary T. Goddard, Cauliflowers . . . .
Hon. George Heywood, Asparagus . . . . .
L. W. Weston, Asparagus . . . . . .
Warren Heustis & Son, Lettuce . . . . . .

MAY 23.

Gratuities : —

Hon. George Heywood, Asparagus . . . . . .
P. G. Hanson, Asparagus . . . . . .
Warren Heustis & Son, Lettuce and Radishes . . .

RHODODENDRON SHOW.

JUNE 4 AND 5.

Theodore Lyman Fund.

BEETS. — Twelve specimens, any variety, John J. Lyon .
Second, Arthur F. Coolidge . . . . . .
Third, Mrs. M. T. Goddard . . . . . .
CARROTS. — Twelve Short Scarlet, W. N. Craig . .
Second, Mrs. Mary T. Goddard . . . . . .
RADISHES. — Four bunches of Turnip Rooted, George D. Moo
Second, H. R. Kinney . . . . . .
Four bunches of Long Scarlet, George D. Moore . .
Second, H. R. Kinney . . . . . .
ASPARAGUS. — Four bunches, twelve stalks each, P. G. Hanso
Second, William H. Hunt . . . . . .
Third, Hon. George Heywood . . . . . .
CUCUMBERS. — Pair, Francis Blake . . . . . .
Second, H. R. Kinney . . . . . .
Third, George D. Moore . . . . . .
LETTUCE. — Four heads, Warren Heustis & Son . . .
Second, George D. Moore . . . . . .
Third, Arthur F. Coolidge . . . . . .
RHUBARB. — Twelve stalks, Warren Heustis & Son . .
Second, P. G. Hanson . . . . . .
Third, Arthur F. Coolidge . . . . . .
MUSHROOMS. — Twenty-four specimens, H. R. Kinney .
TOMATOES. — Twelve specimens, William C. Winter, Pres
Cleveland . . . . . .
Second, W. N. Craig, May's Favorite . . . .
Third, W. N. Craig, Eclipse . . . . . .

Gratuities : —

Hon. Joseph S. Fay, Cauliflowers	1 00
Hon. Joseph S. Fay, Lettuce	1 00
P. G. Hanson, Rhubarb	1 00
Mrs. Mary T. Goddard, Cauliflowers	1 00
Warren Heustis & Son, Collection	2 00
Arthur F. Coolidge, "	1 00
George D. Moore, "	1 00

JUNE 13.

Gratuities : —

Hon. George Heywood, Asparagus	1 00
Norris R. Comley, Cucumbers	1 00
Warren Heustis & Son, Rhubarb	1 00
Hon. Joseph S. Fay, Collection	3 00

JUNE 20.

Gratuities : —

Hon. Joseph S. Fay, Cauliflowers and Lettuce	2 00
Warren Heustis & Son, Collection	2 00

ROSE AND STRAWBERRY SHOW.

JUNE 23 AND 24.

BEETS. — Twelve Summer Turnip Rooted, Sumner Coolidge	3 00
Second, Warren Heustis & Son	2 00
Third, Arthur F. Coolidge	1 00
ONIONS. — Twelve specimens, Warren Heustis & Son	3 00
Second, Sumner Coolidge	2 00
Third, Samuel J. Trepess	1 00
CUCUMBERS. — Pair of White Spine, Warren Heustis & Son	3 00
Second, Arthur F. Coolidge	2 00
Third, Joshua C. Stone	1 00
CABBAGES. — Three of any variety, Warren Heustis & Son, All Seasons	3 00
Second, Hon. Joseph S. Fay	2 00
Third, Warren Heustis & Son, Succession	1 00
LETTUCE. — Four heads of any variety, Arthur F. Coolidge	2 00
Second, Sumner Coolidge	1 00
PEAS. — Half-peck of any variety, Hon. Joseph S. Fay, American Wonder	3 00
Second, Elliott Moore, Notts Excelsior	2 00
Third, George V. Fletcher, American Wonder	1 00

Gratuities : —

James Comley, Potatoes . . . . . .
William C. Winter, Tomatoes . . . . . .
M. T. Stevens, Tomatoes . . . . . .
Warren Heustis & Son, Collection . . . . . .

JUNE 27.

POTATOES. — Twelve specimens, C. W. Hubbard . . .
Second, James Comley . . . . . .
ONIONS. — Twelve specimens, Warren Heustis & Son . .
Second, George D. Moore . . . . . .
SQUASHES. — Four Long Warted, Joshua C. Stone . . .
Second, Arthur F. Coolidge . . . . . .
Four Scalloped, Sumner Coolidge . . . . . .
Second, Arthur F. Coolidge . . . . . .
CABBAGES. — Three of any variety, trimmed, George D. Moore
Second, Warren Heustis & Son, All Seasons . . . .
Third, Warren Heustis & Son, Wakefield . . . . .
BEANS. — Half-peck of String, any variety, Arthur F. Coolidge
Second, Joshua C. Stone . . . . . .
Third, Sumner Coolidge . . . . . .
PEAS. — Half-peck of American Wonder, Hon. Joseph S. Fay
Second, Isaac E. Coburn . . . . . .

Gratuities : —

Warren Heustis & Son, Collection . . . . . .
George D. Moore, " . . . . . .

JULY 11.

Levi Whitcomb Fund.

CABBAGES. — Three Drumhead, trimmed, George D. Moore .
Second, Warren Heustis & Son . . . . . .
BEANS. — Half-peck of Cranberry, Samuel Hartwell . .
Second, Joshua C. Stone . . . . . .
Third, George D. Moore . . . . . .
PEAS. — Half-peck of any variety, George V. Fletcher, Stratagem
Second, Isaac E. Coburn, Advancer . . . . . .
Third, George V. Fletcher, Advancer . . . . .
SWEET CORN. — Twelve ears, Sumner Coolidge . . . .
Second, Joshua C. Stone . . . . . .
TOMATOES. — Open culture, twelve specimens, E. N. Pierce, Stor
Second, Isaac E. Coburn, Comrade . . . . . .
Third, Samuel J. Trepess, Faultless . . . . . .

Gratuities : —

Nathaniel T. Kidder, Tomatoes 1 00
H. R. Kinney, New Pea, Buck's New Life 1 00
H. R. Kinney, Stratagem Peas 1 00
Warren Heustis & Son, Collection 2 00
George D. Moore, Collection 1 00

JULY 18.

POTATOES. — Twelve specimens, Hon. Joseph S. Fay, Hebron . 3 00
Second, Hon. Joseph S. Fay, Rose 2 00
Third, Isaac E. Coburn, Rose 1 00
LETTUCE. — Four heads of any variety, Warren Heustis & Son . 2 00
Second, John Jeffries 1 00
SWEET CORN. — Twelve ears, Sumner Coolidge, Hybrid . . . 3 00
Second, Francis Blake, Crosby 2 00
Third, Sumner Coolidge, Corey 1 00
TOMATOES. — Open culture, twelve specimens, Isaac E. Coburn . 3 00
Second, Samuel J. Trepess, May's Favorite 2 00
Third, Samuel J. Trepess, Faultless 1 00

JULY 18.

Gratuities : —

Hon. Aaron Low, Collection of Beans 2 00
Isaac E. Coburn, Peas 1 00
Rev. Calvin Terry, Peas and Beans 1 00
Warren Heustis & Son, Collection 2 00

JULY 25.

POTATOES. — Any variety, twelve specimens, Isaac E. Coburn, Clark 3 00
Second, Benjamin P. Ware, Roberts's Early 2 00
Third, James Comley, Early Harvest 1 00
SQUASHES. — Three Marrow, Sumner Coolidge 3 00
PEAS. — Half-peck of any variety, Hon. Aaron Low, Stratagem . 3 00
Second, James Comley, Juno 2 00
Third, Isaac E. Coburn, Heroine 1 00
SWEET CORN. — Twelve ears of Crosby, Sumner Coolidge . . 3 00
Second, Francis Blake 2 00
Twelve ears of any other variety, Sumner Coolidge, Hybrid . 3 00
TOMATOES. — Twelve specimens, Samuel J. Trepess, May's Favorite 3 00
Second, Samuel J. Trepess, Stone 2 00
Third, Samuel J. Trepess, Faultless 1 00
NATIVE MUSHROOMS. — Named collection, edible and poisonous varieties to be shown separately, and to be so designated, Hollis Webster 5 00
Third, William W. Burlen 3 00

Gratuities: —

Hon. Aaron Low, Tomatoes . . . . . .
David Fisk, Horticultural Beans . . . . . .
James Comley, Collection . . . . . .
John Jeffries, " . . . . . .

AUGUST 1.

BEANS. — Two quarts of Goddard, shelled, Warren Heustis & Son
Second, Samuel Hartwell . . . . . .
Third, Rev. Calvin Terry . . . . . .
Half-peck of Horticultural, Isaac E. Coburn . . .
Second, Sumner Coolidge . . . . . .
Third, Joshua C. Stone . . . . . .
TOMATOES. — Twelve specimens of Comrade, Isaac E. Coburn
Second, Hon. Aaron Low . . . . . .
Twelve specimens of Stone, Joshua C. Stone . . .
Twelve specimens of any other variety, Samuel J. Trepess, May' Favorite . . . . . .
EGG PLANT. — Four specimens of Round Purple, Arthur F. Coolidge . . . . . .
Second, Sumner Coolidge . . . . . .

Gratuities: —

Dr. George E. Francis, Twenty-six varieties of Mushrooms .
Alexander L. Hayes, Mushrooms . . . . . .
Arthur F. Coolidge, Celery . . . . . .
Hon. Aaron Low, Collection . . . . . .
Warren Heustis & Son, Collection . . . . . .

AUGUST 8.

GREENFLESH MELONS. — Four specimens, Arthur F. Coolidge
Second, Joshua C. Stone . . . . . .
SALMON FLESH MELONS. — Four specimens, Joshua C. Stone
SWEET CORN. — Twelve ears, Rev. Calvin Terry . . .
Second, Sumner Coolidge . . . . . .
Third, Oliver R. Robbins . . . . . .
EGG PLANT. — Four specimens of Round Purple, Arthur F. Coolidge . . . . . .
Second, Joshua C. Stone . . . . . .

Gratuities: —

Boston Mycological Club, Fungi . . . . . .
Samuel Hartwell, Collection . . . . . .
Hon. Aaron Low, " . . . . . .

AUGUST 15.

POTATOES. — Twelve specimens of any variety, Samuel Hartwell, Rose	3 00
Second, Isaac E. Coburn, Hebron	2 00
Third, Samuel Hartwell, Hebron	1 00
ONIONS. — Twelve specimens, Sumner Coolidge	3 00
Second, Benjamin P. Ware, Cracker	2 00
Third, Benjamin P. Ware, Silver Skin	1 00
GREENFLESH MELONS. — Four specimens, Arthur F. Coolidge	3 00
Second, Joshua C. Stone	2 00
SALMON FLESH MELONS. — Any variety, four specimens, Joshua C. Stone	3 00
Second, Frank M. Stone	2 00
CELERY. — Four roots of any variety, Arthur F. Coolidge, Paris Golden	3 00
Second, Warren Heustis & Son, Paris Golden	2 00
Third, Arthur F. Coolidge, Pascal	1 00
BEANS. — Two quarts of Large Lima, Sumner Coolidge	3 00
Two quarts of Goddard, shelled, Benjamin P. Ware	3 00
Second, Isaac E. Coburn	2 00
Third, Warren Heustis & Son	1 00
SWEET CORN. — Twelve ears of Potter's Excelsior, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00
Third, Rev. Calvin Terry	1 00
Twelve ears of any other variety, P. G. Hanson, Quincy Market,	3 00
Second, E. C. Lewis, Quincy Market	2 00
Third, Hon. Aaron Low, Melrose	1 00
PEPPERS. — Twelve specimens of Squash, George Lincoln	3 00
Second, Arthur F. Coolidge	2 00
Third, P. G. Hanson	1 00
Any other variety, E. C. Lewis, Ruby King	3 00
Gratuities: —	
James Comley, Collection	3 00
E. C. Lewis, "	3 00
Hon. Aaron Low, "	1 00
Warren Heustis & Son, Collection	1 00
William C. Bates, Mushrooms	1 00
Henry F. Kellogg, "	1 00

AUGUST 22.

GREENFLESH MELONS. — Four specimens, Joshua C. Stone	3 00
Second, Arthur F. Coolidge	2 00
Third, Isaac E. Coburn	1 00

SALMON FLESH MELONS. — Four specimens, Joshua C. Stone
Second, Frank M. Stone
WATERMELONS. — Pair, Joshua C. Stone
CABBAGES. — Three of any variety, trimmed, Arthur F. Coolidge
CELERY. — Four roots, Arthur F. Coolidge, Paris Golden
Second, Arthur F. Coolidge, Pascal
Third, Warren Heustis & Son, Paris Golden
BEANS. — Two quarts of Large Lima, Sumner Coolidge
Two quarts of Dwarf Lima, Isaac E. Coburn
MARTYNIAS. — Twelve specimens, M. W. Chadbourne
Second, Samuel J. Trepess
NATIVE MUSHROOMS. — Named collection, edible and poisonous varieties to be shown separately, and to be so designated, Hollis Webster
Second, Dr. George E. Francis
Third, J. C. Young

Gratuities: —

A. T. Brown, Tomatoes
Warren Heustis & Son, Celery
Hon. Aaron Low, Collection
Samuel Hartwell, "
P. G. Hanson, "
Mrs. E. M. Gill, "

SEPTEMBER 12.

TURNIPS. — Twelve Flat, H. R. Kinney
Second, John Jeffries
GREENFLESH MELONS. — Four specimens, E. C. Lewis
Second, Sumner Coolidge
Third, Samuel Hartwell
SALMON FLESH MELONS. — Four specimens, Joshua C. Stone
WATERMELONS. — Two specimens, Joshua C. Stone
CAULIFLOWERS. — Four specimens, William H. Teele
LETTUCE. — Four heads of any variety, H. R. Kinney
Second, Sumner Coolidge
Third, George E. Sanderson
CELERY. — Four roots of any variety, Arthur F. Coolidge
Second, Warren Heustis & Son, Pascal
Third, Warren Heustis & Son, Paris Golden
PARSLEY. — Two quarts, Sumner Coolidge
Second, Arthur F. Coolidge
BEANS. — Large Lima, two quarts, Sumner Coolidge
Second, E. C. Lewis
Third, Mrs. Mary T. Goddard

Corn. — Sweet, twelve ears of Potter's Excelsior, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00
Third, Rev. Calvin Terry	1 00
Any other sweet variety, P. G. Hanson, Crosby	3 00
Second, P. G. Hanson, Quincy Market	2 00
Third, Rev. Calvin Terry, Crosby	1 00
Egg Plants. — Four Round Purple, H. R. Kinney	3 00
Second, Arthur F. Coolidge	2 00
Third, Sumner Coolidge	1 00
Tomatoes. — Three varieties, twelve specimens each, Hon. Aaron Low, Paragon, Perfection, Acme	5 00
Second, Hon. Aaron Low, Essex, Ignotum, Imperial	4 00
Third, David L. Fisk	3 00
Twelve Comrade, David L. Fisk	3 00
Second, Hon. Aaron Low	2 00
Third, Isaac E. Coburn	1 00
Twelve May's Favorite, Hon. Aaron Low	3 00
Second, Samuel J. Trepess	2 00
Third, Isaac E. Coburn	1 00
Twelve Stone, Hon. Aaron Low	3 00
Second, P. G. Hanson	2 00
Third, Sumner Coolidge	1 00
Twelve of any other variety, David L. Fisk, Beauty	3 00
Second, Arthur F. Coolidge	2 00
Third, Isaac E. Coburn	1 00
Martynias. — Twelve specimens, Hon. Aaron Low	2 00
Second, Samuel J. Trepess	1 00
Okra. — Twelve specimens, E. C. Lewis	2 00
Second, E. C. Lewis, Dwarf	1 00
Peppers. — Twelve specimens of Squash, Hon. Aaron Low	2 00
Second, George W. Jameson	1 00
Any other variety, Hon. Aaron Low, Ruby King	2 00
Second, E. C. Lewis, Ruby King	1 00
Native Mushrooms. — Named collection, edible and poisonous varieties to be shown separately, and to be so designated, Hollis Webster	5 00
Second, Ellen W. Rumrill	4 00
Third, A. P. Doughty	3 00
Gratuities: —	
Hon. Aaron Low, Collection of Tomatoes	5 00
E. C. Lewis, Collection	5 00
Warren Heustis & Son, "	2 00
Arthur F. Coolidge, "	3 00
P. G. Hanson, "	1 00

September 26.

Gratuity: —	
Warren Heustis & Son, Celery	1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETA

OCTOBER 1 AND 2.

Regular Prizes.

BEETS. — Twelve Turnip Rooted, C. H. Thomas . . .
Second, Joshua C. Stone . . . . . .
Third, Warren Heustis & Son . . . . . .
CARROTS. — Twelve Long Orange, H. R. Kinney . . .
Second, E. C. Lewis . . . . . .
Third, Samuel J. Trepess . . . . . .
Twelve Intermediate, H. R. Kinney . . . . . .
Second, E. C. Lewis . . . . . .
Third, Mrs. Mary T. Goddard . . . . . .
PARSNIPS. — Four varieties, twelve specimens each, H. R. Kinney
Second, Warren Heustis & Son . . . . . .
Third, George D. Moore . . . . . .
POTATOES. — Four varieties, twelve specimens each, C. H. Thomas
Second, Isaac E. Coburn . . . . . .
Third, Mrs. Mary T. Goddard . . . . . .
Twelve Clark, Isaac E. Coburn . . . . . .
Second, Mrs. Mary T. Goddard . . . . . .
Third, C. H. Thomas . . . . . .
Twelve Hebron, F. J. Kinney . . . . . .
Second, Isaac E. Coburn . . . . . .
Third, H. R. Kinney . . . . . .
Twelve Rose, Isaac E. Coburn . . . . . .
Second, H. R. Kinney . . . . . .
Third, C. H. Thomas . . . . . .
Twelve Savoy, Isaac E. Coburn . . . . . .
Second, H. R. Kinney . . . . . .
Third, Mrs. Mary T. Goddard . . . . . .
Twelve of any other variety, C. H. Thomas, Carman No. 3 .
Second, H. R. Kinney, Carman No. 1 . . . . .
Third, Mrs. Mary T. Goddard, Notts Victor . . . .
SALSIFY. — Twelve specimens, George D. Moore . . .
Second, H. R. Kinney . . . . . .
Third, Warren Heustis & Son . . . . . .
TURNIPS. — Twelve Flat, F. J. Kinney . . . . . .
Second, Mrs. Mary T. Goddard . . . . . .
Twelve Swedish, Henry E. Rich, White . . . . .
Second, Henry E. Rich, Skirving's Purple . . . .
ONIONS. — Twelve Danvers, Samuel J. Trepess . . . .
Second, George D. Moore . . . . . .
Third, Hon. J. J. H. Gregory . . . . . .

Twelve Red, Hon. J. J. H. Gregory	3 00
Second, W. N. Craig	2 00
SQUASHES. — Three Bay State, Hon. Aaron Low	3 00
Second, Arthur F. Coolidge	2 00
Third, Warren Heustis & Son	1 00
Three Hubbard, Samuel Hartwell	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00
Three Hybrid Turban, Hon. Aaron Low	3 00
Second, E. C. Lewis	2 00
Third, Arthur F. Coolidge	1 00
Three Marblehead, E. C. Lewis	3 00
Second, Joshua C. Stone	2 00
Three Marrow, Warren Heustis & Son	3 00
Second, Arthur F. Coolidge	2 00
Third, Sumner Coolidge	1 00
BRUSSELS SPROUTS. — Half-peck, John Jeffries	3 00
Second, Nathaniel T. Kidder	2 00
Third, Hon. Aaron Low	1 00
CABBAGES. — Three Drumhead, trimmed, Samuel Hartwell	3 00
Second, Oliver R. Robbins	2 00
Third, B. J. De Souza	1 00
Three Red, trimmed, Hon. Aaron Low	3 00
Second, H. R. Kinney	2 00
Third, E. C. Lewis	1 00
Three Savoy, trimmed, Samuel Hartwell	3 00
Second, H. R. Kinney	2 00
Third, E. C. Lewis	1 00
CAULIFLOWERS. — Four specimens, A. M. Knowlton	5 00
Second, William H. Teele	4 00
Third, B. J. De Souza	3 00
Fourth, Henry E. Rich	2 00
CELERY. — Best kept during the exhibition, four roots of Paris Golden, Arthur F. Coolidge	5 00
Second, Warren Heustis & Son	4 00
Third, H. R. Kinney	3 00
Any other variety, Warren Heustis & Son, Pascal	5 00
Second, A. Nixon, White Plume	4 00
Third, H. R. Kinney, Pascal	3 00
ENDIVE. — Four specimens, E. C. Lewis	3 00
Second, H. R. Kinney	2 00
Third, Mrs. M. Haller	1 00
LETTUCE. — Four heads, Calvin A. Hoar	3 00
Second, Sumner Coolidge	2 00
Third, Warren Heustis & Son	1 00
PARSLEY. — Two quarts, Sumner Coolidge	2 00
Second, Arthur F. Coolidge	1 00

HORSERADISH. — Six Roots, H. R. Kinney . . . . . .
Second, George D. Moore . . . . . .
CORN. — Yellow or Field, twenty-five ears, Elliott Moore . .
Second, Henry E. Rich, Twelve Rowed . . . . . .
Third, Henry E. Rich, Eight Rowed . . . . . .
EGG PLANT. — Four Round Purple, Sumner Coolidge . . .
Second, Arthur F. Coolidge . . . . . .
Third, George D. Moore . . . . . .
TOMATOES. — Three varieties, twelve specimens each, E. C. Lewis,
Second, Hon. Aaron Low, Perfection, Stone, and Cardinal .
Third, Hon. Aaron Low, May's Favorite, Scoville, and Paragon . . . . . .
Twelve Comrade, Hon. Aaron Low . . . . . .
Twelve May's Favorite, Isaac E. Coburn . . . . . .
Second, W. N. Craig . . . . . .
Twelve Stone, Daniel L. Fisk . . . . . .
Second, Hon. Aaron Low . . . . . .
Third, Joseph Thorp . . . . . .
Twelve of any other variety, Arthur F. Coolidge, Puritan . .
Second, Isaac E. Coburn, Ignotum . . . . . .
Third, Hon. Aaron Low, G. A. R. . . . . .
PEPPERS. — Twelve specimens of Squash, George W. Jameson .
Second, George Lincoln . . . . . .
Third, Arthur F. Coolidge . . . . . .
Any other variety, Hon. Aaron Low, Bull Nose . . . . .
Second, Hon. Aaron Low, Ruby King . . . . . .
Third, Hon. Aaron Low, Golden Queen . . . . . .
CULINARY HERBS. — Collection, named, W. N. Craig . . . .
COLLECTION OF VEGETABLES, covering fifty square feet, arranged for effect, H. R. Kinney . . . . . .
Second, Warren Heustis & Son . . . . . .
Third, Arthur F. Coolidge . . . . . .
Fourth, E. C. Lewis . . . . . .

Gratuities : —

Hon. Aaron Low, Collection of Tomatoes . . . . . .
Joshua C. Stone, Watermelons . . . . . .
W. N. Craig, Collection . . . . . .
John Jeffries, " . . . . . .
Warren Heustis & Son, " . . . . . .
P. G. Hanson, " . . . . . .
A. A. Lawrence, " . . . . . .
George D. Moore, " . . . . . .
Mrs. Mary T. Goddard, " . . . . . .

OCTOBER 10.

Gratuity : —

Warren Heustis & Son, Celery . . . . . .

OCTOBER 17.

Gratuity: —

Warren Heustis & Son, Celery 1 00

OCTOBER 24.

Gratuities: —

William C. Winter, Tomatoes 1 00

Warren Heustis & Son, Celery 1 00

OCTOBER 31.

Gratuity: —

Warren Heustis & Son, Celery 1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 21.

CUCUMBERS. — Pair, Francis Blake 3 00

Second, John L. Gardner 2 00

CABBAGES. — Three Red, trimmed, Hon. Aaron Low . . . 3 00

Second, Samuel Hartwell 2 00

Three Savoy, trimmed, Joshua C. Stone 3 00

Second, Warren Heustis & Son 2 00

Third, Samuel Hartwell 1 00

BRUSSELS SPROUTS. — Half-peck, John Jeffries 3 00

Second, John L. Gardner 2 00

Third, Hon. Aaron Low 1 00

CAULIFLOWERS. — Four specimens, A. M. Knowlton . . . 3 00

Second, William H. Teele 2 00

Third, B. J. De Souza 1 00

CELERY. — Four roots, Warren Heustis & Son, Pascal . . . 3 00

Second, Warren Heustis & Son, Paris Golden 2 00

Third, Warren Heustis & Son, Boston Market 1 00

LETTUCE. — Four heads, Joshua C. Stone 3 00

Second, George D. Moore 2 00

Third, Warren Heustis & Son 1 00

TOMATOES. — Twelve specimens, grown under glass, William C. Winter, Stone 3 00

Second, William C. Winter, Perfection 2 00

Third, Francis Blake 1 00

Gratuities: —

Warren Heustis & Son, Collection 3 00

Elisha S. Converse, Mushrooms 1 00

DECEMBER 5.

Gratuities: —

Warren Heustis & Son, Lettuce 1 00

Hon. Aaron Low, Spinach and Brussels Sprouts 1 00

REPORT

OF THE

COMMITTEE ON GARDE

FOR THE YEAR 1896.

By JOHN G. BARKER, CHAIRMAN.

The Committee take pleasure in reporting to the
season of unusual activity and interest, the prizes offer
been competed for more than in any previous season.
have made eleven visits, and on each occasion the su
competition were of unusual merit, and we feel that th
for which the Committee is established has been more
torily carried out than in previous seasons. We ar
report that Mr. David Nevins has entered his fine
Framingham for the H. H. Hunnewell Triennial Pre
that Mrs. Benjamin P. Cheney has also entered her
South Natick for the same Premium. We expect to
first visit at Mrs. Cheney's place in June, 1897.

Your attention is invited to the statements of the var
petitors, which are of practical value.

DAVID NEVINS'S ESTATE, FRAMINGHAM.

The Committee have made two visits to the fine esta
David Nevins, at Framingham. The large extent of t
and the varied fine views lend to it a charm and attra
easily described. To appreciate its beauty it must be seen
no spot anywhere that has not some attraction. As we
estate from Framingham, a portion on the borders of Fr

is laid out with well-planned drives. Here no attempt has been made at artificial treatment, but the native trees have been well cared for, and the grounds kept clean, and with the exception of a few evergreens that have been planted there, it is as near a natural park as can well be. It is a pleasant spot of about 150 acres, and is a fine example of what can be done with a natural piece of woodland where a small amount is laid out to make it accessible for pedestrians and carriage driving. We believe this is open to the public, who enjoy it at their will. Leaving this place, we approach the estate proper, which is reached by a driveway, the borders of which are planted with groups and single specimens of evergreens in well selected varieties. After crossing the county road we enter that part of the estate occupied by the mansion-house, gardens, farm barn, and stables. We find the kitchen-garden well arranged, with a good variety of vegetables and small fruits, all in the highest state of cultivation. There is a small amount of glass structures and cold frames, which are invaluable on an estate of this size. After a highly satisfactory inspection of this department, we retrace our steps to the long drive leading to the mansion-house. Between this drive and the county road there is no fence, but an irregular border of shrubs and evergreen trees of many interesting varieties planted in groups. On the left a large planting of shrubs, in variety, divides the lawn from the meadow, two hundred or more feet from the house, which stands on the highest elevation of the estate. On the east side a large parterre is laid out between the mansion-house and a stone wall not far from the highway, the border in front of the wall being planted with low-growing evergreens. The arrangement of the parterre gives a pleasing approach to the house. On the opposite side of the house the grass grade slopes gradually to the Sudbury River. The stable, at a convenient distance from the house, is hidden by a belt of trees in a very healthy condition. A continuation of the drive to the westerly end of the estate takes us where the extended views are the charm and admiration of all. They are certainly not excelled in New England, and it is doubtful whether they are in old England. In the distance Mount Wachusett is plainly visible, and the beauty and variety of hill and dale with the fine water front can hardly be excelled. We are again attracted by the excellent specimens of evergreens in the border between the estate and the

highway. Particularly noticeable are elegant specimens
concolor, A. Douglasii, A. orientalis, A. Nordmanniana,
pungens of good form and rich coloring. A commendabl
especially in the case of the trees, is that they have
allowed to grow so closely together as to spoil each o
much time and labor are bestowed every year in pru
thinning out the trees and shrubs. Every effort is mad
good specimens of the rarer and choicer varieties of ev
which in the near future will be a splendid feature of t
Perhaps the most enjoyable spot is the piazza of the hou
the most varied and extended views are obtained. In
tance, looking in one direction, we see a train of cars we
way through meadow and woods; in another directio
cattle grazing in the distance — here a stretch of meadow,
large tracts of woodland and meadow, all beyond the wa
Nearer, or between the house and the water front, sma
of trees and single specimens have been planted which e
while yet young, add much to the charm and attracti
the landscape, and when they shall have attained a ful
the beauty of the views will be greatly enhanced. In
and development of the estate much credit is due for
condition of everything to the faithful and persistent
Alexander McKay, Mr. Nevins's gardener, who is deeply i
in the development of the estate; we wish we could rec
such instances of confidence between employer and e
Your Committee are unanimous in their conclusion that t
is one of the finest we have visited in point of natural v
unexcelled scenery. The judicious manner in which it is
and developed has assisted in bringing us to this conclusi
also desire to record our hearty appreciation of the ver
reception given us personally by Mr. Nevins. His stat
regard to his estate is as follows:

Statement of Mr. Nevins.

Framingham, September,

I made my first purchase of land here in the spring
The farm consisted of one hundred and fifty-six acres,
both sides of the Sudbury River, and bounded on the s
nearly a mile by the Boston and Albany Railroad, and

east by Farm Pond. My first work was the taking away of all division walls, getting rid of old and worthless apple orchards, etc. Within a short time the City of Boston seized the Sudbury River, beginning the series of flowage dams, which in the case of my farm on Basin No. 2 has given us a very extensive water view. Within ten years of my first purchase, from neighbors moving away, etc., I had added a large area to the original place, the estate now consisting of nearly five hundred acres. The pasture, about a hundred and fifty acres, west of the river, is fenced; other than this there are no walls or fences on the place, or on the county road running through the farm, ornamental trees and shrubs proving a handsome and sufficient division line.

In 1888, to avail of the better site and extensive views, I moved my house and stable about seventeen hundred feet in distance, directly north of the old location; the new avenue, planting plans, grading, etc., having been laid out and superintended by Mr. Ernest W. Bowditch, landscape engineer and gardener. There is a drive around the entire place, furnishing easy and pleasant communication with all the fields, but the grounds about the house, with the lawns, ornamental planting, kitchen-garden, and main avenue comprise about seventy-five acres. The farm buildings, including the modern three-story barn, are at the extreme southerly end of this part of the estate, and near by is the garden, of a little over two acres, including a moderate amount of glass; and here my gardener, Alexander McKay, has raised the roses, violets, etc., which I have exhibited at the Society's shows, taking many first premiums. I append a report [1] from Mr. McKay on his method of raising violets in frames. Your Committee awarded him their first prize of $40 for these violets last spring.

Very truly, DAVID NEVINS.

To JOHN G. BARKER, ESQ.,
Chairman Committee on Gardens.

[1] See page 293.

CHRYSANTHEMUMS.

The interest in the cultivation of the Chrysanthemu
to be as general, and the growers as enthusiastic, as eve
Committee feel justified in continuing these prizes for
themums, especially as ornamental plants. We have tho
each season has brought better and better plants, but th
room for doubt that the plants at Mrs. Cheney's and at M
Hunnewell's were the best your Committee have seen.

Mrs. Benjamin P. Cheney's Chrysanthemums, S Natick.

We had two competitors for the best house of Ch
mums, arranged for effect with other plants. Our first
at Mrs. Benjamin P. Cheney's (John Barr, gardener).
found a very choice lot of medium sized, well grown plar
two in number, and each one a perfect specimen. T
propagated in January and shifted on to twelve-inch
grown under glass all summer, on side benches, until t
part of August, when they were moved to the house
they were flowered. Mr. Barr says that in growing s
one must try for varieties that are short-jointed, so as to
compact, and must also look out for pleasing colors; so
to go back and grow old varieties to get those points
usually hazardous to depend on the new. They take u
deal of room if you intend doing them well, and requir
deal of air to keep the foliage; but, as a whole, Mr. Bar
would rather grow a house of specimen bush plants thar
of plants with single stems, and, on a private place, th
etor enjoys them more.

Mr. Barr further says that the great point in growi
mens is to keep the soil sweet, and not overdose with fe
but give a little at a time and often.

Mr. Barr's list includes the following varieties, and
that any of them will make nice plants with a little care

White. — Ivory, Theo, Mme. A. Planchon, Mrs. Heal
Cloud, Vernal Fall, Mrs. Robert Craig, Mutual Friend
Williams.

Yellow. — President Hyde, Gold Dust, Whilden, W.
coln, Mrs. Bishop, W. H. Rieman, Savannah, Georgiana B
Primula, Jardin des Plantes, C. Chalfant, Minerva.

PINK. — Pink Ivory, Nemesis, Mons. R. Dean, Iora, Zulinda, L. Boehmer, Mrs. Perrin, Eda Prass, Mrs. S. T. Murdock, Erminilda, Portia, Mrs. Goschen, Duchess of York.

RED. — William Seward, John Shrimpton, Sunrise, Columbine, Golden Hair, Cullingfordii, Mrs. E. M. Bigelow, Emma O. Farel.

The house in which these plants were grown is span-roofed, 50 × 20 feet, arranged for this occasion with a walk through the centre of the house, on the bench, with the plants on either side, so that visitors could look on all at one time. The plants were what may be termed medium in size, but were very uniform, and both flowers and foliage were in the most perfect condition, arranged with excellent taste as to color blending, harmonizing beautifully with the foliage plants, which were not so numerous or so large as to detract from the Chrysanthemums. It was well done, and was in every way a fine show.

In the house of Chrysanthemums on benches, there were eight hundred plants grown to one stem and bloom, which were propagated May 1st, and planted the second week in June, nine inches apart, on benches. There were thirty-six varieties, grown mostly for exhibition, with not two dozen blossoms lost out of the entire lot. Of new varieties Mr. Barr says he cannot say much, and finds it generally impossible to say much about them the first year. The stock, he finds, is generally all run out; it is forced to death, so that sometimes they surprise one the second year. Mrs. Perrin and Modesto are varieties that will make names for themselves Gretchen Buettner is a good white. Violescent and Indiana have long necks, which is against them, but Violescent makes a nice flower. William Simpson is a good, clear pink, but there is not enough to it to make it a good staying variety. Mr. Barr says the trouble on a private place is to make room for Chrysanthemums. This year he potted his pinks in six-inch pots; now, as the Chrysanthemums are used, he cleans out the benches and plants the pinks. The benches are made of such a size that six men can carry out a section filled with loam; and in spring, when the time comes to plant Chrysanthemums, the benches of pinks are carried out, and benches with fresh soil are carried in for the Chrysanthemums. In this way the pinks are all saved, and the Chrysanthemums are not delayed.

Walter Hunnewell's Chrysanthemums, Welle

Our next visit was at Walter Hunnewell's (T. D. gardener), where we saw some very fine specimens inc our request Mr. Hatfield has given us for the Trans leaf out of the book of his own experience, which has over many years, he having been a successful grower a itor for a long time. The many premiums he has recei be a sufficient evidence that he is an expert in the cultu popular plant. During this same time he has furnishe and notes on the Chrysanthemum for "Garden and Fore Hatfield's account forms a valuable contribution to th actions of the Society, and will be read with interes

He writes as follows:

Statement of Mr. Hatfield.

During the season large numbers of small pot Chrysan are bought when in bloom. What to do with the pla out of bloom is a question often asked. When it is ren that Pompon varieties are quite hardy in Massachus many others nearly so, it will be seen that no pam necessary in wintering the plants over. Such as h grown in pots are by the nature of their previous cu tender to be turned out at once. A very cool cellar, s barn cellar, on a shelf near the light, would be a good keep them. A little frost would do them no harm. It to keep the plants cool, for if the place is at all warm t into growth, and this weakens them. I have known th well in an attic, and also in a fairly warm cobbler's shop, windows. They freeze sometimes, but come out all right i Here is a starting point. When spring comes most of t will be a mass of growing shoots. What is generally d divide up the old stool, and plant a number of shoots I do not desire to be tedious, or to hamper the grower many details, but it would be better if a few of the sho a piece of root attached to each, could be started afi separate plants in sandy soil. This could all be don June, after which there would be ample time to trans young plants and get good bushes before the autumn. plants such as I have indicated always have more vi

detached portions of the old stock. During the months of June and July, when the plants are growing fast, they should be frequently topped to induce stocky growth. Some localities are much infested with insects, which often blight the shoots so badly that few flower buds appear. A good plan in such cases is to place a frame work of mosquito netting about the plants, with an opening on one side. This will keep out their worst enemy, the chinch bug. Green and black aphides — small insects which cling to the leaves and buds near the ends of the shoots — often gather in such large numbers as to cripple the shoots seriously. The frequent application of tobacco dust will keep them in check. The plants should be taken up early in September, potted carefully, and stood in some shady place to recover. As cold weather comes they should be housed at night and stood out during the day time.

The large flowers we see on trained specimens are obtained by reducing the number of buds on a shoot to one only. More flowers, but smaller, would naturally come were all the buds allowed to remain. It is just a matter of taste. Small plants of all the leading varieties are offered by the principal florists in spring time. The newest are not always the best. Here is my selection for next season: Morning Crow, pink; Mutual Friend, white; O. W. Holmes, red; Marion Henderson, yellow; Norma, pink; Ivory, white; Columbine, bronze; Garza, white anemone; Savannah, yellow pompon; John Shrimpton, crimson; W. H. Lincoln, yellow; Joseph H. White, white.

This statement was written at the request of the Chairman of the Garden Committee, especially for amateurs and schools. It is in no sense a professional article.

T. D. Hatfield.

William Nicholson's Chrysanthemums, Framingham.

For Chrysanthemums on benches the other applicant was Mr. William Nicholson, whose plants were grown for commercial purposes, on a bench in the centre of a house 15 × 100 feet, and formed a very satisfactory exhibit indeed. We have requested some notes from Mr. Nicholson, and he says: "In regard to Chrysanthemums for 1896 I think quite a little progress has been made — that is, in separating the kinds for exhibition blooms and those for commercial purposes. Mine are all grown

for the latter purpose, therefore I have to discard a go varieties that make very fine exhibition blooms, and give following list of what I think are the best market kinds

"WHITE. — Mrs. Bergmann, Ivory, Mrs. H. Robinso Newett, Mrs. Phipps, Mrs. Jerome Jones, Minnie Wa Niveus, Pelican.

"YELLOW. — Yellow Queen, Major Bonnafon, Gold Lo Lincoln, H. W. Rieman, President Hyde for a pot plant.

"RED. — John Shrimpton and Cullingfordii. John S is good for single stems and pot culture as well.

"PINK. — M. Neval, Mrs. Perrin, Helen Bloodgood, M Murdock, Erminilda, Maud Dean, Ada Spaulding, Ruth

"BRONZE. — Sundew, Harry May, E. G. Hill.

"The plants were propagated from May to the 20th and planted on the benches from the 15th to the 25th of compost the same as last year.

"This year in feeding I used considerable imported bituminous soot and consider it very valuable in kee foliage in good condition."

The fine condition of the plants was the best evidence cultivation; two flowers were grown on each plant, ea dantly large enough for all commercial purposes. An exp florist who accompanied us on this visit said that it wa a house as he ever saw, and that the moderate sized fl which these were so fine samples, would find a much mo market than the larger ones.

CHRYSANTHEMUMS AT OAKMONT, LEXINGTON.

By JAMES COMLEY.

Chrysanthemums are largely grown at Oakmont, m varieties being obtained each season, a list of which, wi descriptions, is given for the benefit of those who may add to their collections.

Adelaide. — Japanese. Deep rose pink; reverse, shel

Autumn Bride. — Japanese, 1896. First exhibited as Queen. Pure white, incurved, fine, early.

Buff Globe. — Japanese Incurved. A buff yellow sp Good Gracious.

Buff Harry. — Incurved. Deep brownish yellow shad petals covered with glandular hairs.

Clarence. — Incurved. Bright red, golden reverse.

Columbine. — Japanese Incurved. Bright red, reverse bronze.

Daydawn. — Japanese. Creamy white, centre tinged sulphur; large, early.

Golden Sunset. — Japanese Incurved. Broad petals covered with glandular hairs; deep old gold.

Headlight. — Japanese Incurved. Deep carmine, reverse silvery pink.

Indiana. — One of the largest flowers to be found in the family, measuring twenty-two inches in circumference, nicely incurved; of a clear bright pink within, lighter color without.

Invincible. — Japanese. White, very large.

Jessie Whitcombe. — Japanese. Deep golden yellow, of immense size, and perfect form.

J. R. Keim. — Bright golden yellow, striped red.

Liberty. — Late; clear rich golden yellow.

Mrs. C. B. Freeman. — Clear yellow; a hirsute variety, being a sport from L. Boehmer.

Mrs. Battles. — Probably the same as Mrs. H. H. Battles.

Mrs. Helen Wright. — Pure ivory white, with age assuming the faintest tint of pink.

Mrs. H. H. Battles. — Japanese Incurved. Large, late, white shading blush at base.

Mrs. Perrin. — The rose pink Ivory; rose pink within, glistening pink without.

Mrs. R. Crawford. — Extra large, clear white, resembling Ivory, but larger; late.

Mrs. T. D. Hatfield. — Incurved. Pure yellow, fine form, high centre.

Mrs. W. W. Raynor. — Japanese. Beautiful clear white, early to mid-season.

Marion Cleveland. — Very large, early, ivory white, shaded delicate lemon at centre.

Midnight. — Crimson lake; very hairy.

New York. — Japanese Incurved. White; globular and massive.

Nanshon. — Japanese. White; globular; mid-season.

Phryne. — High rounded Japanese flowers; inner surface rich red bronze; reverse, bright chrome.

Pride of Castlewood. — Chinese; pure white.

Red Warrior. — Reflexed. Chestnut red, in the style
Coles.

Rena Dula. — Incurved Japanese. Deep rich pink.

Riverside. — Reflexed. Deep canary yellow; broad fl

Signal Light. — Incurved Japanese. Red bronze.

Sibyl Kaye. — Japanese. Salmon pink; reverse, clear

The World. — Japanese. Very large flat flowers, wit
ing petals, pure white.

Tippecanoe. — Japanese Incurved. Terra cotta, wit
reverse; a fine exhibition flower.

Violet King. — Japanese. Pink shaded violet.

W. Matthews. — This must be the same as Governor M
Pale pink, turning to white.

VIOLETS.

It is always the object of the Committee to offer ne
as occasion requires, to encourage the good cultivatio
special subject. In accordance with this principle a p
offered this year for the best bench or frames of violets, v
in such demand during the winter months that a stimulu
cultivation is a public benefit. The violet disease has b
troublesome to many growers, and a few abstracts from
of experienced cultivators may not be out of place. U
head of "Garden Notes," "Garden and Forest," for 1893,
we read: "If we want strong clumps of violets to bloo
winter, we must cut off the runners now (August 9), and
for the violet disease to show itself before remedies c
plied. We hope to ward off a possible attack of diseas
application of fungicides now. We have two batches, a
given an application of sulphide of potassium at the rat
an ounce to a gallon of water, the other a dusting of 'Gr
in twenty parts of air-slacked lime." On page 367 of
volume, E. O. Orpet says, August 30: "Our first prepa
fall is to get the violets under glass as soon as practicab
this time every plant of the winter-flowering double ki
Hume Campbell, is safely under glass, either in the fram
heated house. The showery weather, and consequen
atmosphere, give the exact conditions favorable to the
ment of disease, traces of which are already visibl

removal of plants enables us to keep off overhead moisture. I have tried every known means to circumvent the disease, but have come to the conclusion that there is no cure for diseased plants in an advanced stage, and it is a waste of time and labor to try remedies. Much can be done, however, to keep healthy stock from becoming weak, by taking off all the runners at this season."

The paper of Mr. Alexander McKay, gardener to David Nevins, who has been a successful grower and exhibitor of violets for several years, which is appended, will be read with interest; the frames placed in competition for the prize were well grown; indeed, they were the best your Committee have seen.

Violet Culture in Frames.

The method of cultivation pursued is very simple, and differs in detail but slightly from that in general practice. Cuttings from the strongest runners are obtained at various times during the winter, being taken from the healthiest and most vigorous plants. They are trimmed and planted in boxes of sandy soil, and kept in the greenhouse until well rooted and growing vigorously. They are then transferred to the cold frames, where they remain until planted in the field.

A position where the plants will be shaded part of the day is chosen for their summer growth. A heavy coat of fine manure is given, spread on evenly.

Planting is done early in May, setting in rows eighteen inches apart each way. Hoeing to keep the weeds down and the soil loose, and pulling off useless runners as they appear, are strictly attended to during the growing season.

About the 20th of September the best plants are lifted and planted in frames, space enough being left between the plants to allow a free circulation of air. When planted they are thoroughly watered, and the sashes, lightly shaded, are put on. Air is freely given day and night as long as mild weather continues. When freezing weather arrives they are covered nightly with mats and shutters. Watering is performed with extra care from November to the end of March, being confined to parts showing dry on the surface.

The soil used is composed of three parts of loam and one part of old hotbed manure, with the addition of a light sprinkling of

wood ashes. This is composted a year previous to u
turned over at intervals to insure an intimate mixi
ingredients.

Respectfully yours,

ALEX. MCKAY
Gardener for David

To J. G. BARKER, ESQ.

JAMES COMLEY'S VIOLETS

Were grown in a frame forty feet long by six feet
were the California variety. The cuttings were placed
frame June 1, well watered and kept shaded for ten d
exposed to the sun, and kept well watered until Sep
when they were planted in the frame. They are now
post of one part good old cow manure and one of yel
with a little ground bone dust, and are given plenty of
fine day. The growth was vigorous and free from di
the flowers were produced in abundance.

CARNATIONS

Are so deservedly popular that your Committee thoug
to offer a premium for the best house. There has no
competition we expected, but we have seen enough und
tion to satisfy us that the encouragement which the
offers is a step in the progressive line of Floriculture.
nation is and always will be popular, especially for w
flowers, their keeping qualities being so excellent. Th
little that can be added to the many articles on Carnati
in the popular horticultural journals and the Proceedi
American Carnation Society. William Nicholson, who
only entry, sends the following notes :

"In regard to Carnations I have very little to say a
On account of the dry weather my plants will be quit
take in, but they are very nice, clean, and healthy. I h
of the new varieties on trial. Edith Foster, white,
promising one, and Eldorado, yellow, which I had la
consider one of the very best sent out. I have two or t
promising seedlings of my own, but cannot tell how
turn out until after another year's trial. There are lo

seedlings sent out every year, but very few of them reach the top of the ladder, as the standard is getting very high, and they must be exceptionally good to make a mark for themselves."

Mr. Nicholson's houses were in excellent condition; the plants very healthy, with no sign of disease. High cultivation and cleanliness are the features that characterize all that Mr. Nicholson takes hold of, and his well-merited success is due to his care and skill.

FRUIT GARDEN.

The only application for this premium for the best Fruit Garden was from Mr. Warren H. Heustis, and was made with particular reference to his Strawberry Garden, which contains about one acre. The varieties grown are principally the Marshall and Belmont. The latter variety, Mr. Heustis says, is no back number with him by any means, as it holds it own for productiveness and for price in the Boston market. The plants are set in rows four feet apart and two feet in the row, and allowed to make a bed. A path a foot wide is cut out in the spring, and the plants are thinned out where they are too thick. The Marshall, Mr. Heustis finds, has many plants with no berries set on them, but he says these barren plants will fruit another year. The condition and productiveness of this acre of strawberries were the best evidence of good cultivation; it was quite equal to any acre of strawberries we have seen.

In addition to making a specialty of strawberries, Mr. Heustis is gradually getting into other fruits, — pears, apples, gooseberries, and currants, — and says that it takes the best of land for these purposes, which is a soil bordering on clay. On such a soil the fruit comes very smooth and fair, with scarcely any disease. There are about one hundred and seventy-five young pear trees, divided between Bartlett, Bosc, and Dana's Hovey. Among apples the Gravenstein is considered the best all-around apple for early autumn. We hope to have the pleasure of recording Mr. Heustis's success with his fruit trees at a future time.

VEGETABLE GARDENS.

The competitors for this prize were Col. Frederick Mason, of the Riverside Farm, Taunton (E. C. Lewis, manager), and Warren Heustis & Son, of Belmont. Both these gentlemen have furnished statements, which follow:

STATEMENT OF E. C. LEWIS.

TAUNTON, MASS., Sept. 1

JOHN G. BARKER, ESQ.:

Dear Sir: In reply to your inquiry in regard to th grow, mode of cultivation, etc., I would say that the sists of fifty acres of cleared land; namely, ten acre meadow with clay subsoil, nearly all of which has be twice this season, and forty acres of upland sandy loan part clay subsoil and part coarse sand or gravelly subs

Thirty acres are down to English grass, which ha twice this season.

We use Canada hard-wood ashes for our grass land at the rate of one ton per acre each year in the fall m one hundred pounds of nitrate of soda per acre in the

When we re-seed or seed down we use about five hund of ground bone per acre in addition to ashes. We ke herd of Jerseys, consisting of seven cows and one bull, fed during the summer months, from April to the end o on rye, oats, and peas; oats and vetches, or tares, fodder, etc., of which we usually take two or three c the same land, five or six acres of land being used fo pose, and some of the fodder being cured for winter us

We have about five acres of land planted to roots tables, consisting of one acre of mangolds and sugar land for which was manured with stable manure at t eight cords per acre and eight hundred pounds of Soluble Fertilizer, all applied broadcast and worked in t with a wheel harrow, after which we used a Thomas harrow and then rolled down the land with a light ro seed was planted in rows two feet apart, at the rate o pounds per acre. We commenced cultivating as soon a got up two inches, and thinned them when six inches h common hoe, leaving them from twelve to fifteen inc We estimate the crop as it now stands at from forty t tons on the acre.

The remainder of the five acres of land is planted t squashes, and about one hundred other varieties of nearly all of which are planted so as to use a pony and

between drills. We have water laid on about three acres, supplied by a windmill.

The farm is owned by Col. Frederick Mason.

Warren H. Heustis's Vegetable Garden.

Mr. John G. Barker, *Chairman Garden Committee:*

The Vegetable Garden entered by me contains about twelve acres, consisting of light, low, and soil bordering on the clay. The farm is devoted to a general assortment of garden crops, namely: parsley, carrots, lettuce, onions, spinach, dandelions, cucumbers, cabbages, beans (string and shell), salsify, squashes, melons, corn, rhubarb, and celery. We grow about three hundred thousand celery plants, divided about equally between Paris Golden and Giant Pascal, with a few thousand Boston Market. The early celery is set two feet by four and one-half inches and lettuce or spinach is sown between the rows; for later we set four feet by four and one-half inches. Lettuce is sown every week, using Black Seeded Tennis Ball altogether. For parsley we use the Double Curled; carrots, the Intermediate; onions, the Danvers; spinach, the Round Thick Leafed and the Pointed Leafed; dandelions, the Improved Thick Leafed. Of cucumbers we have the White Spine, and use about five hundred hotbed sashes. Of cabbages we have this year about ten thousand, equally divided between All Seasons, All Head, and Number Two. Of beans we have the Golden Wax and Goddard. The cabbages, cucumbers, and in fact all the crops where it is possible, are succeeded by celery. We use no commercial fertilizers whatever, having an abundance of manure from about twelve hundred pigs. For irrigation we use a sixteen-foot Eclipse windmill and a Blake steam-pump.

Warren H. Heustis.

Bussey Institution, Jamaica Plain.

On the 21st of March the Committee visited the greenhouse of the Bussey Institution to see the hardy shrubs and herbaceous plants, forced by the skilful gardener, Charles Jackson Dawson, whose interesting statement follows:

BUSSEY INSTITUTION OF HARVARD UNIVERSIT

JAMAICA PLAIN,

DEAR MR. BARKER:

Referring to yours of August 12 I would say I s pleased to give you a brief account of the greenhouse y mittee visited on the 21st of March, 1896.

With a few exceptions, the house (which is sixty-five by twenty feet wide) contained nothing but hardy plan were forced out of season. The house was an object les what can be forced with little difficulty, the time t bringing the various sorts into bloom varying from te ten weeks. Our method is to store all the material tha bloomed in cold pits and frames as soon as the frost in autumn, and leave them there at any rate until the tu year, January 1st, but more generally until February 1s

The plants are brought in by instalments, the time ing entirely upon how early or late the plants natural out of doors. For instance, *Kalmia latifolia*, which her outdoors about the middle of June, must be brough moderate heat about the first of January. On the oth with *Erica carnea*, which is one of the earliest spring- shrubs, it is only necessary to allow about ten days at son in order to bring it into bloom.

It might be well to arrange the plants thus brought in in three classes, viz.: Shrubs, Herbaceous Plants, an Bulbs.

Amongst the Evergreen Shrubs the most satisfactory

**Andromeda floribunda.*	*Erica carnea*, in variety
" *Japonica.*	*Genista Germanica.*
" *polifolia.*	**Kalmia glauca.*
* " *speciosa.*	* " *latifolia.*
Berberis Aquifolium.	*Ledum latifolium.*
**Daphne Cneorum.*	*Leucothoë Catesbæi.*

**Rhododendron Catawbiense* hyb., the tender sorts b most satisfactory for forcing.

The Deciduous Shrubs that were forced are numero will only mention the most satisfactory:

**Azalea*, Ghent Hybrids.
* " *mollis*.
**Cercis Japonica*.
**Cytisus scoparius*.
**Deutzia gracilis*.
Exochorda grandiflora.
Lonicera tatarica.
**Prunus cerasus fl. pl.*
**Pyrus spectabilis fl. pl.*
Rhododendron Rhodora.
Ribes aureum.
Rosa multiflora.
Rosa multiflora, the Dawson.
Spiræa arguta.
" *Thunbergii*.
* " *Vanhouttei*.
**Staphylea colchica*.
Syringa Chinensis.
* " *vulgaris* Charles the Tenth.
* " " Marie Lagrange.
**Viburnum opulus*.
" *plicatum*.

You will notice that I have marked the most desirable shrubs with a star (*).

The Herbaceous Plants that were in bloom at the time were few. The noteworthy were:

Astilbe (*Spiræa*) *Japonica*.
" " " *multiflora compacta*.
Cypripedium acaule.
" *spectabile*.
Dicentra spectabilis.
Phlox subulata, in varieties.
Polygonatum giganteum.
Primulas.
Spiræa aruncus.
Viola palmata var. *cucullata*.
" *pedata*.

I cannot pass the Cypripediums without calling special attention to these two beautiful native Orchids. Their forcing qualities are grand, the results being more than satisfactory, and I really considered some pans of *Cypripedium spectabile* the most beautiful plants in our range of houses at the time.

The promiscuous display of Spring Flowering Bulbs scattered throughout the Flowering Shrubs helped to make the house one blaze of bloom. They consisted of:

Dutch Hyacinths.
Tulips.
Hardy Narcissuses.
Erythroniums.
Lily of the Valley.
Italian Anemones.
Arisæma triphyllum.
Camassia esculenta.
Iris Persica.
Lilium Harrisii.
" *longiflorum*.
" *umbellatum*.
Muscari botryoides.
" " *alba*.

And others, all in great variety.

The above-mentioned plants, with the exception
Ericas, Acacias, Indian Azaleas, and Genistas, made up
tents of the house, showing what a complete and sa
show can be made during the winter with our beauti
spring-flowering plants, both native and foreign.

To set forth in detail the many points necessary to
class of plants to the proper stage would encroach
upon your time.

Hoping this will prove what you desire,

I remain very sincerely,

CHARLES JACKSON D

AUGUST 28, 1896.

CAMELLIA HOUSE ON THE ESTATE OF THE LATE F
HAYES, OAKMONT, LEXINGTON.

Not since the days of Hovey and Wilder has this
ular flower been grown to the perfection in which it is
at Oakmont; indeed at the places mentioned, although t
fine collections, it was not cultivated to the extent that
Many of the plants here were from Mr. Wilder's colle
is true that the Camellia is not the popular florist's flow
once was; still it is altogether too useful to be discarde
rose has supplanted it in a great measure, for certain
purposes it is superior to the rose. One of the reaso
ceeds so admirably here is the fact that the plants are
a bed specially prepared for them. This bed is th
square, and a few are grown in pots. The bed has bee
nine years; the largest plant in the house stands tw
high and ten feet through; the trunk is eighteen incl
cumference. This plant has produced the present sea
than a thousand flowers and buds. The collection
fifty-nine varieties. The varieties planted out are:

Alba plena (the old Double White). — Flowers pu
large, full; petals round, evenly and regularly arrang
perfect.

Armida Nova.

Candidissima. — Late blooming, double white; a very
grower; the plants have a shapely appearance, and flo
freely.

Charles Downing.

C. H. Hovey. — Flowers dark velvety crimson; petals round and symmetrical, imbricated; habit vigorous; foliage rich and ample.

C. M. Hovey. — Flowers scarlet crimson, large and regular in outline; petals finely formed and of great substance; growth vigorous; habit fine.

Countess of Orkney. — Flowers white, often flaked with crimson; of medium size, full, cupped; petals slightly incurved in the early stages of the flower, round, even, and regular; foliage fine.

Dunlap's White.

Fanny Bolis.

Fimbriata. — Flowers white, large, full, flattish; the petals are evenly and regularly arranged, the edges finely serrated so as to give them a fringed appearance. It is a variety of *alba plena*, but less vigorous.

Imbricata. — Flowers large, perfectly round; cherry red, shaded with carmine lake; regularly imbricated; remains a long time in bloom.

Madame Louis Van Houtte. — A sport from Jenny Lind. Of vigorous growth and exceedingly floriferous. Flower of good size; rich rose, shaded and faintly reticulated with clear carmine and bordered with pale rose.

Mrs. Abby Wilder. — Flowers white, occasionally faintly shaded with flesh color and striped with lake; of medium size, full, imbricated, perfect in form; foliage and habit good.

Mrs. Cope. — Flowers blush, flaked and dashed with carmine; of medium size, full, cupped; petals rounded, even, and regular; habit good.

Pæoniflora.

President Clark.

Reine des Beautés. — Flowers pale flesh color, occasionally tinged or striped with rose; of medium size, full, flattish; petals round; foliage and habit fine.

Sacco. — Light rose; a very free flowering variety.

Sarah Frost. — Flowers deep rosy pink, sometimes rayed with white; large, full, flattish; petals round, even, and regular; habit good.

Wilderi. — Delicate clear rose; of the most perfect rose shape, retaining its beauty a long time. Originated by the late Hon.

Marshall P. Wilder, and first exhibited at the rooms of t
sachusetts Horticultural Society, February 14, 1846.

The splendid condition of the plants was ample proof
best mode of cultivation had been adopted; it is
whether another such collection can be found — certainl
this vicinity. A writer in the "Encyclopædia Brit
whose name is not given, says: "To be seen in their
fection Camellias should be planted out in borders of
prepared soil under glass, but these borders should be ver
ually drained, and of such a mechanical composition as
become soddened, for the plants require to be almost
with water when making their growth and when developi
blossoms. The borders, moreover, when the plants have
well established and the soil full of roots, will requi
assisted by top dressings and by applications of liquid
They by no means require a heated structure, nor to
sunlight, but when well established in a cool and so
shaded conservatory, may become a source of infinite de
those who have a love for flowers."

William Nicholson's House of Forced Tomatoes, Framingham.

Mr. Nicholson writes:

"In regard to my house of Tomatoes, they were sown in
October, afterwards transplanted into flats, and again tra
into six-inch pots, and were planted on benches the m
December, after my chrysanthemums were all cut, in t
loam that the chrysanthemums were grown in, which
fertilized with Jeffard's animal fertilizer. We also top
them with it about once in two weeks when they began
and fed them with liquid manure. We began to pick the
March, and there was quite a crop on them when we pull
out on the 15th of July. We cut about four thousand
from this house, fifteen by one hundred feet, and were
very little by club-root this year. I think it is on acc
using a good quantity of lime. I find that limewater i
good thing for club-root in roses also."

The following article, taken from the "Florists' Exchange," September 5, 1896, is reproduced here as of value to all who are engaged in this industry:

Winter Forcing of Tomatoes.

Preparations for this work should now be well under way, and if the tomato seed is not already sown no time should be lost in doing so, for every day is of value now. The seed needs to be sown in a light soil, and just as soon as the plants are large enough to handle pot them up, singly, in two-inch pots, using a nice light liberal soil. Grow the plants on carefully and avoid drawing or coddling them, but make a point of keeping them stocky yet not starved. It is essential to their welfare that they never suffer from any kind of neglect. Immediately the roots spread all through the soil, pot up into, say, a four-inch pot, using a more retentive soil, which should consist of good sound loam and short, well-rotted manure. Attend carefully to the watering and keep the plants moving lively, but not forced. Then, as soon as they will stand it, get them potted into their fruiting pots, or planted out on the bench, if so desired. To get early fruit, however, pots are to be preferred, the roots being then more under control.

For the final potting the soil requires to be kept more lumpy; try and retain all the fibre possible, and see that there is ample drainage, so arranged that the water will get away freely. Use a little solid, yet well-rotted, horse or cow manure. A small portion of quarter-inch bone may also be used, but it is better to provide for feeding after the pots are full of roots than to make the soil very rich at first; for this reason, the more growth the less liable is one to get a good set of fruit; and this is important, for on an early set depends whether or not tomatoes can be picked in December and January.

As the plants grow, be careful to trim away all lateral or side shoots. It is better to train to a single stem and keep to that unless the plant is very thrifty and shows an inclination to make a good second stem, which frequently happens.

Another point to watch is the distribution of the plants, that they will get the greatest amount of sunshine. That brings us to the question of training, and of doing this there is a variety of methods. Some adopt only a single stake, others make a

wooden horse or inverted ∧, leaving a path so that two be easily attended to, and in this particular, doub method is by far the best. Our preference is given to t adopted by W. Turner, at Rockwood, Tarrytown, makes a wire arch on his centre beds, about seven which he places inside his two rows of plants. This a acute, but well rounded, so that there is abundant roo plants to grow and rest upon it. A board is place ground underneath the arch, which is high enough to man doing the work of tying and pruning.

The houses are span-roof, eighteen feet wide, so th four rows of plants, two being on the centre bed and o the side benches, the plants, individually, standing abou inches to two feet apart. Sometimes they are in pots; they are planted out.

The next question — and a vital one — is that of var these there are but few, and we name them in order lence, according to our experience: Lorillard, Esse Early Michigan, Aristocrat, Early Ruby. Very frequen Champion is used, and with many it is popular for sid but for this purpose we think Early Michigan is be fruit is even-surfaced, of good color, and medium si Ruby will produce lots of fruit, but the corrugatio from its value. Aristocrat is a heavy tomato, but and Essex Hybrid are preëminently the two best.

The Committee have made the following awards:

Special Prize from the John A. Lowell Fun

For the best house of Chrysanthemums arranged fo effect with other plants, Mrs. Benjamin P. Cheney
Second, Walter Hunnewell . . . . .

Society's Prizes.

For the best house or houses of Chrysanthemums grow on benches, Mrs. Benjamin P. Cheney . .
Second, William Nicholson . . . . .
For the best bench or frames of Violets, David Nevin
Second, James Comley . . . . . .

For the best Carnation house, William Nicholson . .	$40 00
For the best Fruit Garden, Warren H. Heustis . .	50 00
For the best Vegetable Garden, E. C. Lewis . . .	50 00
Second, Warren H. Heustis	30 00

Gratuities.

Bussey Institution, for a house of Forced Spring Flowering Plants	30 00
James Comley, for a house of Camellias planted in the ground and well grown	30 00
William Nicholson, for a house of Forced Tomatoes .	30 00

Amount appropriated		$500 00
Awarded for prizes	$390 00	
Awarded for gratuities . . .	90 00	
	$480 00	
Balance unexpended . . .	20 00	
		$500 00

Respectfully submitted,

JOHN G. BARKER,
AZELL C. BOWDITCH,
J. WOODWARD MANNING,
E. W. WOOD,
C. N. BRACKETT,
JOSEPH H. WOODFORD,
HENRY W. WILSON,
JACKSON DAWSON,
Committee.

REPORT

OF THE

COMMITTEE OF ARRANGEM

FOR THE YEAR 1896.

Another year has passed away, and we are call
chronicle the events pertaining to our part of the
tained by our exhibitions.

The same obstacles obstruct the way that we poi
our last report, and until we have more commodiou
which to hold our exhibitions, and suitable accomm
the comfort of visitors, we cannot expect enhanced
admission.

The arrangements of the halls have been good,
consideration the limited space at our command, a
often been congratulated on their splendid appearanc
particularly at the Chrysanthemum Show. We are i
good friend of the Society, Jerome Jones, Esq., for
three splendid vases to complete the number appl
exhibitors, and these together with the five belon
Society when filled with chrysanthemums were grand
the exhibition. If the same number of prizes for la
chrysanthemums or other long-stemmed flowers are
future Schedules, this will make a good chance for s
disposed person to distinguish himself or herself by
to the Society some vases to fill up the deficiency
exists.

We constantly bear in mind that, without the he
ation of the gardeners, our exhibitions would be ut
and without interest to them or the public; therefore
is under great obligations to this class of intelligent m

thanks are tendered to them for their enthusiastic interest in the cultivation and exhibition of flowers and the success of our exhibitions.

We would at this time call the earnest attention of the gardeners to the altered rules and prizes in the new Schedule, now being revised by the Committee on Establishing Prizes, for some of the alterations are of the utmost importance to exhibitors, and deserve very careful attention.

We are very happy to say that, notwithstanding the same insufficient accommodations are in use as last year, the arrangements of the halls have been so carefully studied and carried out that no friction has occurred and all unpleasantness has been avoided.

The amount of money which was placed at the disposal of this Committee for extraordinary expenses has been judiciously expended, always having in view the best interests of the Society.

The Treasurer reports the receipts for admission to the

Spring Show	$555 25
Chrysanthemum Show	767 50
Total	$1,322 75

all of which has gone into the treasury of the Society.

The receipts at the Chrysanthemum Show were not so large as last year, although the show was very much superior; probably owing to two days of stormy weather and inadequate accommodations for the comfort of visitors.

All of which is respectfully submitted.

Jos. H. Woodford,
Chairman.

REPORT

OF THE

Committee on School Gardens and Children's Her

FOR THE YEAR 1896.

By HENRY L. CLAPP, CHAIRMAN.

GEORGE PUTNAM SCHOOL GARDEN, ROXI

Twenty-seven new species and varieties were place garden during the season of 1896, namely:

Antennaria plantaginifolia.
Apios tuberosa.
Aralia nudicaulis.
Aspidium cristatum var. *Clintonianum.*
Aspidium Goldianum.
" *spinulosum* var. *dilatatum.*
Bidens frondosa.
Galium Aparine.
Geranium Carolinianum.
" *Robertianum.*
Habenaria lacera.
" *orbiculata.*
" *virescens.*
Helianthemum Canaden
Hieracium venosum.
Houstonia cærulea.
Hypoxis erecta.
Lilium Canadense.
Lycopodium lucidulum.
Pedicularis Canadensis
Phegopteris hexagonopte
Prenanthes serpentaria.
Pteris aquilina.
Trientalis Americana.
Trillium erythrocarpum
" *grandiflorum.*
Viola striata.

The ground was well fertilized in the spring at a co dollars. Two new beds of hardy chrysanthemums w In October every teacher's desk in the district was deco chrysanthemums in variety. The garden contains el eties of German iris. The *Clematis paniculata*, *Euony cans*, tiger lilies, asters, and golden-rods have made exc

ASTER CORDIFOLIUS. — George Putnam School Garden.

A CORNER OF THE FERNERY. — George Putnam School Garde

FOURTH GRADE PUPILS OBSERVING. — George Putnam School Garden.

fine growths, owing to the unusual moisture of the season. Six species of native asters have been introduced into the girls' yard spontaneously by seed, and have made vigorous growths. Single plants springing from seed scattered at random blossom much more profusely than clumps of two or more years' standing. Thorough division of clumps is essential to the vigor of the plant and the production of blossoms. A few plants have died out, but most of the plants originally introduced have increased greatly and might aid in establishing other gardens. There are now over one hundred and fifty species of native wild plants in the garden, not to speak of a great variety of hardy cultivated plants.

The garden has been used for observation more this year than in any previous year, composite flowers and ferns receiving the most attention. The pupils of the last graduating class studied minutely fifteen species and varieties of ferns, and twenty-two of these pupils introduced ferns into their own gardens at home. The fernery in the angle of the school building on the north side was visited many times for the comparison and identification of species. Many kinds of seed vessels of flowers, as well as the flowers themselves, have furnished excellent material for drawing, especially with pen and ink.

The influence of this work has been felt in the preparation of herbariums, a majority of the exhibitors at the last Herbarium Exhibition having enjoyed the advantages of this garden. It is hoped that the educative value of the garden may be shown by larger numbers of pupils from year to year.

In comparison with European countries, especially France, Germany, Austria, Sweden, and Russia, school-garden privileges in this country are exceedingly limited. Since 1877 every public school in Berlin, a large *city* in Prussia, has been regularly supplied with plants for study every week, elementary schools receiving specimens of four different species and secondary schools six. During the summer at six o'clock in the morning two large wagons start from the school gardens, loaded with cuttings packed and labelled for the different schools. The daily papers regularly announce what plants may be expected, and teachers consult with the gardeners as to what ought to be sown or planted. Teachers take their classes into the school gardens for lessons in botany, and are aided by the gardeners who cut the specimens.

Still more significant is the recent establishment of many school

gardens in Southern Russia. In one province two h
twenty-seven schools out of a total of five hundred an
school gardens, whose total area is two hundred and
acres. In 1895 these gardens contained one hundred
thousand fruit trees and two hundred thirty-eight tho
hundred planted forest trees. In them the sc
teach tree, vine, grain, garden, silkworm, and b
They are supported by small grants of money, from
and district councils. In the villages small orchards
gardens are connected with many primary schools.
ment has also widely spread over different provinces
Russia. It is worthy of the attention of a Society
least so far as calling the attention of school officials t
ing out of a city child's education in a very practic
The fundamental ideas obtained by a child from dir
with the things found in the gardens mentioned are
to any ideas obtained from the objects commonly four

CHILDREN'S HERBARIUMS.

The Children's Herbariums, November 27 and 28, 1896, filled the Lower Hall. Most of the exhibitors of this year had exhibited specimens before, and had learned by observation how to mount plants with the utmost neatness; consequently no careless or hasty work was to be found in the entire exhibit. Those who are able to compare this exhibit with that of 1891 can appreciate the manifest progress that has been made.

The herbarium of Arthur E. French, of Sudbury, was a model of neatness. One can imagine how extensive his explorations must have been, and how much labor was involved in the preparation of his exhibit, by considering the following facts: In 1895 he obtained the first prize for one hundred and twenty-five flowering plants, the first prize for twenty specimens of sedges, and an extra award for excellence in pressing and mounting specimens. This year he exhibited fifty grasses, including thirteen species of Panicum, and one hundred and twenty-five flowering plants, twenty sedges, and ten ferns, all different plants from those which he had previously exhibited.

Arthur C. Faxon, of Jamaica Plain, made an exhibit equally notable, in the form of a fifth contribution to our Annual Herbarium Exhibition. He exhibited one hundred and twenty-five herbaceous plants, grasses, sedges, and ferns. When we consider that these were all different species or varieties of plants from the many which he has shown at four previous exhibitions, we can understand how diligently he has worked and how carefully he has observed. His specimens were complete and accurately named. Among them were the rare asters *A. Faxoni*, *A. Herveyi*, *A. infirmus*, and *A. subulatus*.

Miss Lura J. Durgin, of Boston, received the first prize for one hundred and twenty-five flowering plants, which were finely mounted and showed every essential part. In the case of some specimens the upper part of the plant, including the flowers, was on one sheet and the lower part, including the root, on another.

The Committee, with the aid of all the expert assistance they could call in, were not able to name some specimens in this col-

lection. This shows the need of a permanent herbari reference.

Miss Carrie P. Webber, of Bedford, who had exhibit previously, sent one hundred additional flowering plants teen ferns, the mounting and naming being well done.

Five girls and one boy from Roxbury, Lulie D. Ellis, M Wood, Ada C. Wood, Isabelle F. Wiggin, Genevieve A. and John P. Goudy, exhibited excellent mounts of fern

Gordon Weinz, nine years old, who took a prize for fift ing plants in 1895, sent in twenty-five additional flowerin this year.

There was only one collection of sprays of leaves, whi bered thirty-nine sheets. Like the other herbariums, t sent by Katherine A. Dwyer, of Roxbury, showed great its preparation.

Mention should be made of Phillips Barry's gift of t sheets of botanical specimens to the George Putnam Scho ing in all one hundred and twenty-seven sheets that he h to the school. These with the eighty-four sheets of lea presented by Arthur C. Faxon make a working herba over two hundred specimens.

The attendance was eminently satisfactory, the estima about one thousand persons during the two days of the Ex Parents, teachers, and children asked a great many qu and they will be heard from next year.

The thought seemed to prevail that the exhibition was t of schools and not of individual pupils. Teachers asked, to what grade does this pupil belong?" Parents seemed their children could take no part in the work unless they with a school. It is hoped that parents and teachers wil individual children to engage in preparing herbariums. I in getting together a school herbarium that any large nu children may be expected to continue their efforts.

The prize of fifty ferns offered by Mr. George E. Da for the best collection of native ferns sent to the ex attracted the attention which it deserved. There were n for this prize, owing to a mistaken idea that ferns once e here could not be entered again for this special prize; t the parts of fern collections that have been exhibited he ally were left at home. Next year Mr. Davenport will o

prizes of ferns, and, now that the matter is understood by those who have exhibited ferns in this hall, we have reason to expect to see some large and fine collections.

It seems proper here to mention that a fine botanical building is to be erected at a cost of $250,000 in the Botanical Garden at Bronx River Park, New York. It is but the start of an institution which it is expected will be superior to any similar one in the country. Particular mention is made of an herbarium and a place for it. Perhaps the Massachusetts Horticultural Society in erecting a new building is not going to be outdone by an Association in New York with $750,000 in hand.

The amount appropriated by the Society for the use of this Committee was . .		$250 00
Awarded for Herbariums	$55 75	
Awarded for School Gardens . . .	15 00	
Suffolk Engraving Company (cuts) . .	10 00	
Printing	37 50	
Advertising	11 40	
Paper	9 81	
Expressage, posters, stamping, etc, . .	6 54	
		146 00
Balance unexpended		$104 00

HENRY L. CLAPP, Roxbury,
MRS. H. L. T. WOLCOTT, Dedham,
GEORGE E. DAVENPORT, Medford,
MISS KATHARINE W. HUSTON, Roxbury,
MRS. P. D. RICHARDS, West Medford,
WILLIAM P. RICH, Chelsea,
W. E. C. RICH, *Secretary*,
99 Moreland st., Roxbury, Mass.

Committee on School Gardens and Children's Herbariums.

PRIZES AND GRATUITIES AWARDED FOR SC GARDENS AND CHILDREN'S HERBARIUMS

SCHOOL GARDENS.

George Putnam School, first prize . . . . .

CHILDREN'S HERBARIUMS.

Flowering Plants. — For one hundred and twenty-five specimens, first prize, Lura J. Durgin . .
Second, Arthur C. Faxon . . . . . .

Gratuities: —
Arthur E. French, for one hundred and twenty-five additions . . . . . .
Carrie P. Wilder, for one hundred additions .
Gordon Weinz, for twenty-five additions . .

Ferns. — For twenty specimens, first prize, John P. Goudy . . . . . .
For fifteen specimens, second prize, Carrie P. Webber,
For ten specimens, first prize, Ada C. Wood .
Second, Isabelle F. Wiggin . . . . .

Gratuities: —
Arthur E. French, for ten additions . . .
Genevieve A. Goudy, for ten additions . .
Mabel M. Wood, for ten additions . . .
Lulie D. Ellis, for seven additions . . .
Arthur C. Faxon, for five additions . . .

Grasses. — For fifty specimens, first prize, Arthur E. French . . . . . .

Gratuity: —
Arthur C. Faxon, for nine additions . . .

SEDGES.

Gratuities : —

Arthur E. French, for twenty additions . .	$3 00
Arthur C. Faxon, for eleven additions . .	2 00

LEAF SPRAYS. — For thirty-nine sheets, first prize, Katherine A. Dwyer 2 00

Gratuity : —

Arthur C. Faxon, for thirty additions . . .	2 00
Total for Herbariums and Gardens . .	$70 75

REPORT

TO THE

STATE BOARD OF AGRICULTU

FOR THE YEAR 1896.

By GEORGE CRUICKSHANKS, OF FITCHBU

The Massachusetts Horticultural Society began the
the year with a course of Lectures and Discussions on
related to the art and science of horticulture, by the f
named speakers:

January 11. Hardy Garden Plants, by E. O. Orp
Lancaster.

January 18. Conservatism in Scientific Agriculture,
W. H. Jordan, Orono, Me.

January 25. Stove Plants in their Native Tropics,
George L. Goodale, Cambridge.

February 8. Seed Control: Its Aims, Methods, and
by Gilbert H. Hicks, Washington, D.C.

February 15. Some Scale Insects, by Prof. L. O.
Washington, D.C.

February 29. Some Tendencies and Problems in th
tion of Species among Parasitic Fungi, by Prof. G
Atkinson, Cornell University, Ithaca, N.Y.

March 14. Ornamental Planting for Parks an
Grounds, by William S. Egerton, Albany, N.Y.

March 21. Grasses, by F. Lamson-Scribner, Washing

March 28. Manuring Orchards, by Prof. Edward B.
New Brunswick, N.J.

April 11. Mushrooms, Edible and Poisonous, by W
Bates, Boston.

The lectures and discussions are printed in the Transactions of the Society.

The sum of $8,050 was appropriated for Prizes and Gratuities for 1896.

The Annual Spring Show was held March 24–27. For a number of years much attention has been given to the cultivation of the cyclamen. On a large table at the entrance of the upper hall was the largest and finest show of cyclamens ever seen in Horticultural Hall. The display of spring flowering bulbs, such as fragrant hyacinths, lilies of the valley, narcissuses, jonquils, and tulips was very fine. Notable among pot plants were *Acacia pubescens* and *A. Drummondii*. A fine specimen of the new hardy climbing rose, Crimson Rambler, with nearly two hundred flowers, in fine condition, attracted much attention. The show of cinerarias, roses, carnations, pansies, and violets was very fine. There was a good display of early vegetables, and winter apples and pears.

The Rose and Strawberry Show was held June 23 and 24. The upper hall was devoted to a fine display of roses and large collections of orchids and other flowering plants. In the lower hall about two hundred baskets of strawberries were exhibited. The six baskets of Marshall, four quarts each, on a table near the entrance were the centre of attraction. All the standard varieties and many new seedlings were shown. There was a fine show of hothouse grapes, some bunches weighing nearly seven pounds each. The show of early vegetables was not large, but was very fine.

The Annual Plant and Flower Show opened September 2 for two days. The lower hall was devoted to cut flowers. A raised bank on the platform at the rear of the hall was covered with over twelve hundred dahlias, comprising all sizes and colors and perfect in form. Four long tables were covered with a great variety of cut flowers, including asters, phlox, dianthus, zinnias, and French cannas, with large collections of wild flowers. Pot plants were shown in the upper hall. There were large and fine collections of ferns, palms, crotons, dracænas, fuchsias, and orchids in variety. Several large tanks of aquatic plants were shown. One tank contained twenty-five choice varieties of Nymphæas and Nelumbiums.

The Annual Exhibition of Fruits and Vegetables was held

October 1 and 2. The show of pears was smaller
but apples were abundant. Many fine specimens of
shown, but no outdoor peaches and very few plums
G. Smith, of Cambridge, one of the oldest mem
Society, celebrated his eightieth birthday, October 1
ing sixty varieties of hardy native grapes, the lar
ever made by one individual. The show of vegeta
the lower hall, and included all the standard vari
were all well grown and of good quality.

The Annual Chrysanthemum Show opened Nover
continued four days. The lower hall was filled with
Seven large vases were filled with some of the choic
The tables from the door to the platform were com
with a superb display of cut flowers. The upper
voted to the pot plants. In the centre of the ha
groups arranged for effect. Palms and other foliage
used with the chrysanthemums; the effect was ve
one side of the hall were arranged plants in twelve-in
were seven feet broad and five or six feet high, a
masses of bloom. For large flowers, fine color, and
the Chrysanthemum Show of 1896 has never been e

Respectfully submitted,

GEORGE CRUICKSH

REPORT

OF THE

COMMITTEE ON THE LIBRARY

FOR THE YEAR 1896.

Cultivators continue to send here for exhibition more illustrations of their skill than can be satisfactorily shown in our limited space; and, in the same way, books and pamphlets continue to find their way to the library regardless of the lack of accommodations they find here; but the increase of exhibits and of books is not a matter to be deprecated — still less to be curtailed. The remedy in each case is the same, and we should no more cease to acquire books and pamphlets than we should cease to send plants, flowers, fruits, and vegetables here to delight and instruct the crowds that throng our halls on all special occasions. The exhibitions, the discussions, and the library are three agencies which have taken and will continue to take an equal share in sustaining and extending the renown of the Massachusetts Horticultural Society.

As usual there is but little to say about this department. The work here continues to fully occupy the Librarian and those who are associated with him. The accessions, which will be enumerated as a supplement to the report of the Librarian, have been of the usual number and importance, and those which have been purchased from the income of the Stickney Fund and from the Society's appropriation have exhausted the entire amount as usual. The Card Catalogue of plates will proceed henceforward on a different plan. Mrs. Andrews has retired from her labors, having written cards for nearly every plate which is not in Pritzel's Index, and it is thought that all the cards made neces-

sary by new acquisitions can be prepared by the force regularly employed. It will be desirable to include in it sometime all which we possess that are in Pritzel's Index, but that time is not yet.

Your Committee, believing that the library is an agency of very great value, regret that the fund to which it owes so much of its growth is soon to pass into other hands, and hope that means may be found which will enable it to continue its increase in size and usefulness.

For the Committee,

W. E. ENDICOTT,
Chairman.

REPORT

OF THE

SECRETARY AND LIBRARIAN

FOR THE YEAR 1896.

As Secretary I have to report in regard to the TRANSACTIONS of the Society that the first part for 1896 has been printed and distributed to members and correspondents of the Society. Of the preceding TRANSACTIONS, the List of Library Accessions, which has previously been published in the second part for each year, was, by direction of the Committee on Publication, omitted in 1895, in order not to delay other matter, and will appear later as Part III. of the TRANSACTIONS for that year. This is the most difficult part of the whole, and requires more labor to present it correctly, but it is now nearly ready for the printer. The Schedule of Prizes for 1896 was, as promised, ready at the beginning of the year, — indeed a few days earlier, — and it is expected that that for 1897 will be equally prompt. The various records of the Society and of Committees, and the correspondence, have been kept up, to the best of the ability of those immediately employed on them.

The List of Library Accessions, though not much longer than last year, shows a steady increase. The work of completing sets has been pursued as heretofore. A special effort has been made to procure such publications of the United States Department of Agriculture as we did not already possess. The full list of these publications, received in March, has afforded much assistance in this work; and the result is that we have now 123 bound volumes and 708 pamphlets of that Department, which was established in 1862, and of the Agricultural Reports of the Patent Office which preceded it. This is more than three-fourths of the whole number, and it is intended to continue the work of col-

lecting as opportunity shall offer. Of course, muc
part of those acquired are from the Department, bu
sistance has been derived from the donations of th
the late Charles M. Hovey and Hon. Marshall P.
Ex-Presidents of the Society, and of the New Engl
Genealogical Society. Some idea of the magnitud
of collecting these publications may be formed from
during the year ending June 30, 1896, 376 publ
issued by the Department of Agriculture. The w
much less but for the great irregularity in the re
publications, necessitating frequent applications fo
to fill gaps; and too often we are informed, thou
cation is made as soon as the hiatus is discovered,
tion is exhausted. A most fortunate acquisition i
sion of "Old and Remarkable Trees of Scotland,"
the Highland and Agricultural Society of Scotland,
which has been on our shelves for thirty years. Th
little work is now perfected.

Ten volumes of the Silva of North America, b
member, Charles S. Sargent, have been published,
and ten having been received during the year now
seldom that a work of the importance and magnitu
pears so rapidly and promptly. The Phycotheca
cana, a collection of dried specimens of the Al
America, whose leading author, Frank Shipley C
a member of this Society, has reached its fifth
Evolution of Horticulture in New England, by D
Slade, another of our members, though smaller, is
interesting, and derives additional value from the l
of its author soon after its publication. The aut
three works have all sought and found in this libr
in their composition.

During the year Parts VIII. and IX. of the M
thian's Monograph of the Genus Masdevallia, co
magnificent work, have been received. The publi
gerald's Australian Orchids, the first part of whic
by us in 1880, which was interrupted by the death
has been resumed, and it is hoped will be soon co
Florilegium Harlemense, with colored plates of
bulbous rooted plants, has been subscribed for and

ber has been received, and a copy of its predecessor, the Album Van Eeden, has also been obtained.

It has ever been the purpose of those charged with the selection of books for purchase to acquire all American works suited to this library, and in pursuance of this purpose we secured at an auction sale a copy of the American Flora or History of Plants and Wild Flowers, with colored plates, by A. B. Strong, M.D., published in New York, 1848 to 1851. The first volume of the Illustrated Flora of the Northern United States, Canada and the British Possessions, by Nathaniel Lord Britton, Ph.D., and Hon. Addison Brown, published at New York during the present year, has also been received. In another class of books, L'Horticulteur Français, in twenty-one volumes, with many colored plates, published at Paris from 1851 to 1873, is a valuable acquisition.

The culture of Nuts of various kinds is beginning to attract much attention. Previously to this year we possessed only one or two German books on this subject, but this year we have added one from the Division of Pomology in the United States Department of Agriculture, on Nut Culture in the United States, with colored and plain plates, and the widow of our lamented Corresponding Member, Andrew S. Fuller, has presented a copy of his book, The Nut Culturist, published since his death.

We are indebted to one of our members, Dr. William P. Bolles, for several valuable German works on Medical and Physiological Botany. A Manuscript Journal of horticultural operations, kept in Dorchester from 1822 to 1836, presented by Mrs. J. F. Pratt, is a unique book. It would be interesting to know who was the writer, but the book affords no clew to his name.

The extraordinary interest which has grown up in the last two years in Edible Mushrooms has led to a much more general use of our books on that subject, by members and others, and it is a source of gratification that these inquirers have found the Library so well equipped to meet them. It is to be hoped — and we trust it will be so — that when a similar interest shall be awakened in any other subject connected with the work of the Society, the Library may be found equally well prepared, and that books which may now appear comparatively useless may then be found of the highest value.

In estimating the value of this library it should never be for-

gotten that its chief use is as a reference and not as a
library. As there seems to be continual danger of mis
on this point, I take the liberty to repeat what was sai
report some years ago: "Statistics of circulation are
argument as regards a library whose maintenance ensur
ervation of the best fruits of advanced research, in a
accessible to scholars and students. As has been w
competent judges, treating of a 'library for advanced
for persons making researches of a learned nature,' —
reaped from it by the community cannot be reckon
method of statistics. It is by means of such collecti
that some of the greatest benefactors of the public
to prosecute their researches and do their work.'"

The book of Library Wants, for the reception of
of such books as may be desired by members, which ha
at the Librarian's desk for nearly twenty years, is sti
the expression of such desires. I regret that it has n
more entries, and hope that hereafter it may be more

A count of the books, etc., in the Library was made
summer, which resulted as follows: Books, 9,875;
6,781; Nursery and Seed Catalogues, 7,273.

I wish here to express my grateful sense of the appr
the Library Committee of the difficulties surrounding t
the Library, and the heartiness with which the Librar
assistants have been supported in the discharge of the

ROBERT MANN
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TREASURER'S REPORT

FOR THE YEAR 1896.

Massachusetts Horticultural Society *in account current to December 31, 1896, with* **Charles E. Richardson,** *Treasurer.*

1896.	Dr.		
Dec. 31.	To amount paid on account of the Library in 1896:		
	For books, periodicals, and binding .	$400 00	
	From income of Josiah Stickney Fund for books	684 57	
			$1,084 57
	To amount paid Interest on Funds for Prizes, etc., credited below		1,892 72
	To Prizes awarded in 1895 paid in 1896 as follows:		
	For Plants	$1,981 06	
	" Flowers	2,517 68	
	" Fruits	1,531 53	
	" Vegetables	1,167 00	
	" Gardens and Greenhouses . .	485 00	
	" H. H. Hunnewell Prizes for Rhododendrons	105 00	
	" Special Prize for Palms at Carnation Show	100 00	
			7,887 27
	To amount paid Committee on School Gardens and Children's Herbariums		146 00
	" " Salaries of Secretary, Assistant, and Treasurer . .	$3,600 00	
	" " Salaries of Committees . .	1,008 00	
	" " extra services in Library and on Transactions . . .	657 25	
	" " Committee of Arrangements .	399 90	
	Amounts carried forward	$5,665 15	$11,010 56

Amounts brought forward	$5,665 15	$11,010 56
To amount paid for Insurance	90 20	
" " Repairs	500 50	
" " Furniture and Exhibition Ware	4 50	
" " Heating	526 54	
" " Lighting	849 44	
" " Water Rates	247 40	
" " Publication and Discussion	291 80	
" " Taxes, 1896	2,580 00	
" " Commission	30 00	
" " Incidentals	702 91	
" " Stationery, Printing, and Postage	2,232 59	
" " Labor	2,739 10	
" paid to Mrs. P. Manning	5,500 00	
" " H. H. Hunnewell	4,000 00	
" advanced A. P. Loring	2,500 00	
" paid for Legal Services	550 00	
		29,010 13
Total payment		$40,020 69
Balance of Cash, December 31, 1896		6,600 61
		$46,621 30

1896.	Cr.			
Jan. 1.	By Balance of account rendered December 31, 1895			$7,495 35
	By amount received from Building in 1896, viz.:			
	Rent of Stores	$16,834 14		
	" Halls	3,058 34		
			$19,892 48	
	By Income from Mount Auburn		3,682 87	
	" Massachusetts State Bounty		600 00	
	" Annual Exhibitions:			
	Gross receipts	$1,322 75		
	Less expenses	759 66		
			563 09	
	" Admissions and Assessments		1,288 00	
	" Notes Receivable		304 85	
	" Sales of Transactions		7 00	
	" Interest on Bonds	$1,272 50		
	" " Bank Balance	29 59		
	" " other sources	60 00		
			1,362 09	
	" Josiah Stickney Fund for duplicate book		85	
	" H. H. Hunnewell, prize money for 1895		32 00	
	" H. H. Hunnewell		5,000 00	
	" Casualty Insurance Company of St. Louis		4,000 00	
	" Chicago, Burlington, and Quincy R.R. Bond, matured		500 00	
	" Interest credited following Funds charged above:			
	Samuel Appleton Fund	$50 00		
	John A. Lowell Fund	50 00		
	Theodore Lyman Fund	550 00		
	Josiah Bradley Fund	50 00		
	Benjamin V. French Fund	25 00		
	H. H. Hunnewell Fund	200 00		
	William J. Walker Fund	117 72		
	Levi Whitcomb Fund	25 00		
	Benjamin B. Davis Fund	25 00		
	Marshall P. Wilder Fund	50 00		
	Amounts carried forward	$1,142 72	$37,233 23	$7,495 35

Amounts brought forward . . .	$1,142 72	$37,233 23	$7,495 35
J. Lewis Russell Fund .	50 00		
Josiah Stickney Fund, as agreed	700 00		
		1,892 72	
			39,125 95
			$46,621 30

CHARLES E. RICHARDSON,
Treasurer.

H. H. HUNNEWELL,
FRANCIS H. APPLETON,
AUGUSTUS HEMENWAY,
} *Finance Committee.*

ASSETS AND LIABILITIES OF THE MASSACHUSETTS HORTICULTURAL SOCIETY,

DECEMBER 31, 1896.

ASSETS.

Real Estate		$250,000 00	
Stereotype Plates and copies of History		257 00	
Chicago, Burlington & Quincy R.R. Bonds		1,000 00	
Sinking Fund		23,872 50	
Kansas City, Clinton & Springfield R.R. Bonds		1,980 00	
Library		35,897 19	
Furniture and Exhibition Ware		6,993 41	
A. P. Loring, Executor		7,500 00	
Due from Tenants		1,535 46	
Cash		6,600 61	
			$335,636 17

LIABILITIES.

Mortgage		$1,000 00	
H. H. Hunnewell		1,000 00	
Josiah Stickney Fund, payable to Harvard College, 1899		12,000 00	
Prize Funds invested in Building:			
Samuel Appleton Fund,	$1,000 00		
Theodore Lyman "	11,000 00		
John A. Lowell "	1,000 00		
Josiah Bradley "	1,000 00		
Benjamin V. French "	500 00		
H. H. Hunnewell "	3,000 00		
William J. Walker "	2,354 43		
Levi Whitcomb "	500 00		
Benjamin B. Davis "	500 00		
	$20,854 43		
Prize Funds invested in Bonds:			
H. H. Hunnewell Fund	$1,000 00		
Marshall P. Wilder "	1,000 00		
J. Lewis Russell "	1,000 00		
	3,000 00		
		23,854 43	
Prizes for 1896, payable in 1897		8,050 00	
			45,904 43
Surplus			$289,731 74

CHAS. E. RICHARDSON, *Treasurer.*

Membership Account of Massachusetts Horticultural Society, December 31, 1896.

Life Members per last report	563		
Added during 1896	23		
Commuted from Annual	1		
		587	
Deceased		33	
			554
Annual Members per last report	222		
Added during 1896	20		
Reinstated	1		
		243	
Commuted to Life	1		
Deceased	13		
Resigned	6		
Dropped for non-payment for two years	11		
		31	
			212
Present Membership			766

INCOME FROM MEMBERSHIP.

23 new Life Members @ $30	$690 00
20 new Annual Members @ $10	200 00
1 commuted to Life	20 00
Annual Assessments	378 00
	$1,288 00

CHARLES E. RICHARDSON, *Treasurer.*

Dr. *Massachusetts Horticultural Society in account with the Proprietors of the Cemetery of Mt. Auburn.* Cr.

For Sales and Improvements within the Cemetery for the year ending December 31, 1896.

To cost of filling up and improving land at Mount Auburn for the year ending December 31, 1896, the Massachusetts Horticultural Society being charged with their proportion of the same:				By sales in January	$290 00
Birch to Eagle and Cherry Avenues	$230 62			" " February	—
Magnolia Avenue and Vinca Path	277 50			" " March	85 00
	$508 12			" " April	1,305 00
				" " May	2,614 60
One-quarter of $508.12 is	$127 03			" " June	3,539 00
Balance due Mass. Horticultural Society	3,682 87			" " July	490 00
		$3,809 90		" " August	3,060 00
				" " September	952 00
				" " October	1,540 00
				" " November	980 00
				" " December	890 00
					$15,745 60
				Net amount received from Receiving Tomb	894 00
					$16,639 60
				Deduct for annual expenses	1,400 00
					$15,239 60
		$3,809 90		Mass. Horticultural Society ¼ part of $15,239.60	$3,809 90

E. & O. E.

H. B. MACKINTOSH, *Treasurer.*

DECEMBER 31, 1896.

MASSACHUSETTS HORTICULTURAL SOCIETY
To the PROPRIETORS OF THE CEMETERY OF MOUNT AUBURN, *Dr.*

For one-fourth part of the following expenditures, for the grading new lands for sale during the year 1896:

Birch to Eagle and Cherry Avenues.

102½ days, men	$230 62	$230 62

Magnolia Avenue and Vinca Path.

74 days, man and horse	$277 50	277 50
		$508 12
One-fourth of $508.12 is		$127 03

JAMES C. SCORGIE,
Superintendent of the Cemetery of Mount Auburn.

MOUNT AUBURN, December 31, 1896.

I certify the foregoing to be a true copy of improvements for the year 1896, rendered by the Superintendent.

H. B. MACKINTOSH, *Treasurer.*

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1897.

President.
FRANCIS H. APPLETON, of Peabody.

Vice-Presidents.
CHARLES H. B. BRECK, of Brighton. WALTER HUNNEWELL, of Wellesley.
AUGUSTUS PARKER, of Roxbury. BENJAMIN P. WARE, of Clifton.

Treasurer and Superintendent of the Building.
CHARLES E. RICHARDSON, of Cambridge.

Secretary and Librarian.
ROBERT MANNING, of Salem.[1]

Professor of Botany and Vegetable Physiology.
BENJAMIN M. WATSON, of Jamaica Plain.

Professor of Entomology.
SAMUEL H. SCUDDER, of Cambridge.

Delegate to the State Board of Agriculture.
E. W WOOD, of West Newton.

[1] Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

STANDING COMMITTEES.

Executive.

THE PRESIDENT, FRANCIS H. APPLETON, CHAIRMA
THE CHAIRMAN OF THE FINANCE COMMITTEE, H. H. HUNNEWEL
WILLIAM C. STRONG. BENJAMI
WILLIAM H. SPOONER. WALTER
NATHANIEL T. KIDDER. CHARLES
CHARLES F. CURTIS.

Finance.

H. HOLLIS HUNNEWELL, OF BOSTON, CHAIRMAN.
FRANCIS H. APPLETON. AUGUSTUS

Lectures and Publication.

J. D. W. FRENCH, OF BOSTON, CHAIRMAN.
BENJAMIN M. WATSON. NATHANIE

Library.

WILLIAM E. ENDICOTT, OF CANTON, CHAIRMAN.
GEORGE W. HUMPHREY. WALTER S.
EDWIN FAXON. GEORGE E.

Plants.

AZELL C. BOWDITCH, OF SOMERVILLE, CHAIRMAN.
JAMES COMLEY. WILLIA
JAMES WHEELER. ARTHU

Flowers.

J. WOODWARD MANNING, OF READING, CHAIRMAN.
MICHAEL H. NORTON. FREDERICK
KENNETH FINLAYSON. GEORGE E.

Fruits.

E. W. WOOD, OF WEST NEWTON, CHAIRMAN.
CHARLES F. CURTIS. WARREN FENNO. J. WIL
O. B. HADWEN. SAMUEL HARTWELL. SUMNE

Vegetables.

CHARLES N. BRACKETT, OF WATERTOWN, CHAIRMAN
CEPHAS H. BRACKETT. VARNUM FROST. WALT
P. G. HANSON. WARREN H. HEUSTIS. AARO

Gardens.

JOHN G. BARKER, of Boston, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND ARRANGEMENTS, *Ex officiis*.

HENRY W. WILSON. JACKSON DAWSON.

For Establishing Prizes.

WILLIAM J. STEWART, of Winchester, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis*.

MRS. P. D. RICHARDS.

Committee of Arrangements.

JOSEPH H. WOODFORD, of Boston, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis*.

ROBERT FARQUHAR.

MEMBERS FOR LIFE.

Members of the Society and all other persons who may kn changes in residence, or other circumstances showing that the is inaccurate in any particular, will confer a favor by prom cating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in rega whose names are marked thus †.

Adams, Luther, Brighton.
Albro, Charles, Taunton.
Alger, Rev. R. F., Becket.
Allen, Hon. Charles H., Lowell.
Ames, Frank M., Canton.
Ames, George, Boston.
Ames, Oakes, 2d, North Easton.
Ames, Preston Adams, Boston.
Amory, Charles, Boston.
Amory, Frederick, Boston.
Andrews, Charles L., Milton.
Andrews, Frank W., Washington, D. C.
Andros, Milton, San Francisco, Cal.
Appleton, Edward, Reading.
Appleton, Francis H., Peabody.
Appleton, William S., Boston.
Ash, John, Pomfret, Conn.
Atkins, Edwin F., Belmont.
Ayling, Isaac, M. D., Brookline.

Bailey, Jason S., West Roxbury.
Bancroft, John C., Boston.
Banfield, Francis L., M. D., Worcester.
Barber, J. Wesley, Newton.
Barnard, James M., Malden.
Barnard, Robert M., Everett.
Barnes, Walter S., Somerville.
Barnes, William H., Boston.
†Barney, Levi C., Boston.
Barratt, James, East P
Barrett, Edwin S., Con
Barry, William C., Ro
Bartlett, Edmund, New
Beal, Leander, Boston.
Becker, Frederick C., bridge.
Beckford, Daniel R., Plain.
Beebe, E. Pierson, Bo
Beebe, Franklin H., B
Beebe, J. Arthur, Bost
Berry, James, Brookli
Birchard, Charles, Fra
Blake, Francis, Westo
Blake, Frederick A., B
Blakemore, John E., B
Blanchard, John W., B
Blinn, Richard D., Chi
Bliss, William, Boston
Boardman, Samuel M.
Bôcher, Prof. Ferdinan
Bockus, Charles E., B
Bosler, Frank C., Carl
†Botume, John, Wyon
Bowditch, Azell C., S
Bowditch, Charles P.,
Bowditch, James H., B
Bowditch, Nathaniel I.
Bowditch, William E.,
Bowker, William H.,

Brackett, Cephas H., Brighton.
Brackett, Charles N., Watertown.
Bresee, Albert, Hubbardton, Vt.
Brewer, Francis W., Hingham.
Brigham, William T., Honolulu, Hawaii.
Brooks, J. Henry, Milton.
Brown, Alfred S., Jamaica Plain.
Brown, Charles E., Yarmouth, N. S.
Brown, Edward J., Weston.
Brown, George Barnard, Brookline.
Brown, George Bruce, Framingham.
Brown, John T., Newburyport.
Bullard, John R., Dedham.
Bullard, William S., Boston.
Burnett, Harry, Southborough.
Burr, Fearing, Hingham.
Burr, Matthew H., Hingham.
Buswell, Edwin W., Brooklyn, N. Y.
Buswell, Frank E., Brooklyn, N. Y.
Butler, Aaron, Wakefield.
Butler, Edward K., Jamaica Plain.

Cabot, Edward C., Brookline.
†Cadness, John, Flushing, N. Y.
Cains, William, South Boston.
Calder, Augustus P., Boston.
Cameron, Robert, Cambridge.
Campbell, Francis, Cambridge.
Capen, John, Boston.
Carlton, Samuel A., Boston.
Carr, Hon. John, Roxbury.
Carter, Charles N., Boston.
Carter, Miss Maria E., Woburn.
Cartwright, George, Dedham.
Chadbourne, Marshall W., Mount Auburn.
Chaffin, John C., Newton.
Chamberlain, Chauncey W., Boston.
Chase, Andrew J., Lynn.
Chase, Daniel E., Somerville.
Chase, George B., Boston.
Chase, William M., Everett.
Cheney, Mrs. Elizabeth S., Wellesley.
Childs, Nathaniel R., Boston.
Choate, Charles F., Southborough.
Christie, William, Newton.
Claflin, Hon. William, Newtonville.
Clapp, Edward B., Dorchester.
Clapp, James H., Dorchester.
Clapp, William C., Dorchester.
Clark, Benjamin C., Boston.
Clark, B. Preston, Cohasset.
Clark, Miss Eleanor J., Pomfret Centre, Conn.
Clark, J. Warren, Rockville.
Clarke, Miss Cora H., Jamaica Plain.
Cleary, Lawrence, West Roxbury.
Clough, Micajah Pratt, Lynn.
Cobb, Albert A., Brookline.
Cobb, John C., Milton.
Coburn, Isaac E., Everett.
Codman, James M., Brookline.
Codman, Ogden, Lincoln.
Collamore, Miss Helen, Boston.
Converse, Elisha S., Malden.
Converse, Parker L., Woburn.
Coolidge, Joshua, Mount Auburn.
Cottle, Henry C., Boston.
Cowing, Walter H., West Roxbury.
Cox, Thomas A., Dorchester.
Coy, Samuel I., Boston.
Crawford, Dr. Sarah M., Roxbury.
Crocker, Miss S. H., Boston.
Crosby, George E., West Medford.
†Crowell, Randall H., Chelsea.
Cummings, Hon. John, Woburn.
Curtis, Charles F., Jamaica Plain.
Curtis, George S., Jamaica Plain.
Cushing, Livingston, Weston.
Cushing, Robert M., Boston.

†Daggett, Henry C., Boston.
Dana, Charles B., Wellesley.
Davenport, Albert M., Watertown.
Davenport, Edward, Dorchester.
Davenport, George E., Medford.
Davenport, Henry, New York.
Davis, John, Lowell.
Dawson, Jackson, Jamaica Plain.
Day, William F., Egypt.
Dee, Thomas W., Mount Auburn.
Denny, Clarence H., Boston.

Denton, Eben, Dorchester.
Dewson, Francis A., Newtonville.
Dexter, F. Gordon, Boston.
Dickerman, George H., Somerville.
Dike, Charles C., Stoneham.
Doliber, Thomas, Brookline.
Donald, William, West Roxbury.
Dorr, George, Dorchester.
Dove, George W. W., Andover.
Dowse, William B. H., West Newton.
Draper, Hon. Eben S , Hopedale.
Dreer, William F., Philadelphia, Pa.
Dunlap, James H., Nashua, N. H.
Durant, William, Boston.
Durfee, George B., Fall River.
Dutcher, Frank J., Hopedale.

Eaton, Horace, Cambridge.
Edgar, William W., Waverly.
Eldredge, H. Fisher, Boston.
†Eldridge, E. H., Roxbury.
Eliot, Charles, Brookline.
Ellicott, Joseph P., Boston.
Elliot, Mrs. John W., Boston.
Elliott, William H., Brighton.
Endicott, William E., Canton.
Endicott, William, Jr., Boston.
Everett, William, Dorchester.
Ewell, Warren, Dorchester.

Fairchild, Charles, Boston.
Falconer, William, Pittsburgh, Pa.
Farlow, Lewis H., Newton.
Farnsworth, Mrs. William, Dedham.
Farquhar, James F. M., Roslindale.
Farquhar, John K. M. L., Roxbury.
Farquhar, Robert, Boston.
Faxon, John, Quincy.
Fewkes, Arthur H., Newton Highlands.
Finlayson, Kenneth, Brookline.
Fisher, David, Montvale.
Fisher, James, Roxbury.
†Fisher, Warren, Roxbury.
Flagg, Augustus, Boston.
Fletcher, George V., Belmont.
Fletcher, John W., Chelsea.
Fletcher, J. Henry, B
Flint, David B., Bost
Foster, Francis C., Ca
Fottler, John, Jr., Do
Fowle, George W., Ja
Fowle, William B., A
French, Jonathan, Bo
French, J. D. William
French, S. Waldo, Ja
French, W. Clifford, N
Frohock, Roscoe R., M

Galloupe, Charles W.,
Galvin, John, Boston.
Gardner, George A., B
Gardner, George P., B
†Gardner, Henry N., M
Gardner, John L., Bro
Gibbs, Wolcott, M.D.,
Gill, George B., Medf
Gillard, William, Har
Dorchester.
Gilmore, E. W., North
Gilson, F. Howard, Re
Glover, Joseph B., Bo
Goddard, A. Warren,
Goddard, Joseph, Shar
Goddard, Mrs. Mary T
Goodell, L. W., Dwigh
Gorham, James L., Ja
†Gould, Samuel, Bost
Gowing, Mrs. Clara
Green.
Gray, James, Wellesle
Gregory, Hon. James
head.
Greig, George, Toront
Grey, Benjamin, Mald
Guild, J. Anson, Broo

Hadwen, Obadiah B.,
Hall, Edwin A., Camb
Hall, George A., Chel
Hall, George R., M.D.
Hall, Lewis, Cambridg
Hall, William F., Bro
Halliday, William H.,

Hammond, Gardiner G., New London, Conn.
Hammond, George W., Boston.
Hammond, Samuel, Boston.
Hanson, P. G., Woburn.
†Harding, George W., Arlington.
Harding, Louis B., Stamford, Conn.
Hardy, F. D., Cambridgeport.
Harris, Charles, Cambridge.
Harris, Thaddeus William, A. M., Keene, N. H.
Harwood, George Fred, Newton.
Haskell, John C., Lynn.
Hastings, Levi W., Brookline.
Hatch, Mrs. C. S., North Cambridge.
Hatch, Edward, Boston.
Hathaway, Seth W., Marblehead.
Hawken, Mrs. Thomas, Rockland, Me.
†Hazeltine, Hazen, Boston.
Hemenway, Augustus, Canton.
Henshaw, Joseph P. B., Boston.
Hews, Albert H., North Cambridge.
Heywood, Hon. George, Concord.
Hilbourn, A. J., Boston.
Hill, John, Stoneham.
Hittinger, Jacob, Mount Auburn.
Hoar, Samuel, Concord.
Hodgkins, John E., Portsmouth, N. H.
Hoitt, Hon. Charles W., Nashua, N. H.
Hollingsworth, Amor L., Milton.
Hollis, George W., Grantville.
Hollis, John W., Allston.
Holmes, Edward J., Boston.
Holt, Mrs. Stephen A., Winchester.
Horner, Mrs. Charlotte N. S., Georgetown.
Horsford, Miss Kate, Cambridge.
Hovey, Charles H., Pasadena, Cal.
Hovey, Stillman S., Woburn.
Hubbard, Charles T., Weston.
Hubbard, Charles Wells, Weston.
Hubbard, Gardiner G., Washington, D. C.
Hubbard, James C., Everett.
Humphrey, George W., Dedham.
Hunnewell, Arthur, Wellesley.
Hunnewell, Henry Sargent, Wellesley.
Hunnewell, H. Hollis, Wellesley.
Hunnewell, Walter, Wellesley.
Hunt, Dudley F., Reading.
Hunt, Francis W., Melrose.
†Hunt, Franklin, Boston.
Hunt, William H., Concord.
Hyde, James F. C., Newton Highlands.

Jack, John George, Jamaica Plain.
Jackson, Charles L., Cambridge.
Jackson, Robert T., Dorchester.
Janvrin, William S., Revere.
Jeffries, John, Boston.
Jenks, Charles W., Bedford.
Johnson, J. Frank, Boston.
Jones, Jerome, Brookline.
Jose, Edwin H., Cambridgeport.
Joyce, Mrs. E. S., Medford.

Kakas, Edward, West Medford.
Kelly, George B., Jamaica Plain.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
†Kendall, Joseph R., San Francisco, Cal.
Kendall, Dr. Walter G., Atlantic.
Kendrick, Mrs. H. P., Allston.
Kennedy, George G., M.D., Roxbury.
Kent, John, Brookline.
†Keyes, E. W., Denver, Col.
Keyes, John M., Concord.
Kidder, Charles A., Southborough.
Kidder, Nathaniel T., Milton.
†Kimball, A. P., Boston.
King, Franklin, Dorchester.
Kingman, Abner A., Brookline.
Kingman, C. D., Middleborough.
Kinney, John M., Boston.
Knapp, Walter H., Newtonville.

Lancaster, Charles B., Newton.
Lawrence, Amory A., Boston.

Lawrence, Amos A., Boston.
Lawrence, James, Groton.
Lawrence, John, Groton.
Learned, Charles A., Arlington.
Lee, Charles J., Dorchester.
Lee, Daniel D., Jamaica Plain.
Lee, Francis H., Salem.
Lee, Henry, Boston.
Leeson, Hon. Joseph R., Newton Centre.
Lemme, Frederick, Charlestown.
Leuchars, Robert B., Boston.
Lewis, William G., Framingham.
Lincoln, George, Hingham.
Lincoln, Col. Solomon, Boston.
Little, James L., Brookline.
Lockwood, Rhodes, Boston.
Lodge, Richard W., Swampscott.
Loftus, John P., Dorchester.
Loring, Caleb W., Beverly Farms.
Lothrop, William S. H., Boston.
Lovett, George L., West Newton.
†Lowder, John, Watertown.
Lowell, Augustus, Boston.
Luke, Elijah H., Cambridgeport.
Lumb, William, Boston.
Lunt, William W., Hingham.
Lyman, George H., Wareham.
Lyman, Col. Theodore, Brookline.
Lyon, Henry, M. D., Charlestown.

†Mahoney, John, Boston.
Mallet, E. B., Jr., Freeport, Maine.
Mann, James F., Ipswich.
Manning, Jacob W., Reading.
Manning, Mrs. Lydia B., Reading.
Manning, Robert, Salem.
Manning, Warren H., Brookline.
Marshall, Frederick F., Chelsea.
Mason, Col. Frederick, Taunton.
Matthews, Nathan, Boston.
McCarty, Timothy, Providence, R.I.
McClure, John, Revere.
McWilliam, George, Whitinsville.
Melvin, James C., West Newton.
Merriam, Herbert, Weston.
Merriam, M. H., Lexington.
Merrifield, William T., W
Merrill, Hon. Moody, Ro
Metivier, James, Cambri
Milmore, Mrs. Joseph, W
D. C.
Minton, James, Boston.
Mitton, Edward J., Broo
Mixter, George, Boston.
Monteith, David, Dedha
Montgomery, Alexander
Moore, John H., Concor
†Morse, Samuel F., Bos
Moseley, Charles H., D
Mudge, George A.,
N. H.
Murphy, William Bowe

Nevins, David, Framing
Newman, John R., Win
Newton, Rev. William W
Nickerson, George A., I
Norton, Charles W., All
Norton, Edward E., Bos

Oakman, Hiram A., N
field.
Olmsted, John Charles,

Packer, Charles H., Bos
Paige, Clifton H., Matt
Paige, John C., Boston.
Palmer, Julius A., Jr.,
Parker, Augustus, Roxb
Parker, Charles W., Bo
Partridge, Horace, Nort
Paul, Alfred W., Dight
Peabody, Francis H., B
Peabody, John E., Bost
Peck, O. H., Denver, C
Peck, William G., Arli
Peirce, Silas, Boston.
Perkins, Edward N., Ja
†Perry, George W., Ma
Philbrick, William
Centre.
Pierce, Dean, Brookline
Pierce, George Francis,

Poor, John R., Boston.
Porter, James C., Wollaston.
Potter, Joseph S., Fredericksburg, Va.
Prang, Louis, Roxbury.
Pratt, Laban, Dorchester.
Pratt, Lucius G., West Newton.
Pratt, Robert M., Boston.
Pratt, William, Winchester.
Pray, Dr. Mark W., Boston.
†Prescott, Eben C., New York.
Prescott, William G., Quincy.
Pringle, Cyrus G., Charlotte, Vt.
Prouty, Gardner, Littleton.
Putnam, Joshua H , Newton Centre.

Quinby, Hosea M., M.D., Worcester.

Raddin, Everett W., North Cambridge.
Rand, Miss Elizabeth L., Newton Highlands.
Rand, Harry S., North Cambridge.
Rand, Oliver J., Cambridgeport.
Rawson, Warren W., Arlington.
Ray, James F., Franklin.
Ray, Hon. James P., Franklin.
Ray, Hon. Joseph G., Franklin.
Raymond, Walter, Boston.
Read, Charles A., Manchester.
Reardon, John B., Boston.
Reed, George W., Boston.
Rice, George C., Worcester.
Richards, John J., Boston.
Richardson, Charles E., Cambridge.
Rinn, J. Ph., Boston.
Ripley, Charles, Dorchester.
Ripley, Ebed L., Hingham Centre.
Robbins, I. Gilbert, Melrose Highlands.
Robinson, John, Salem.
Robinson, Joseph B., Allston.
Robinson, Warren J., Somerville.
Ross, Henry, Newtonville.
Ross, Waldo O., Boston.
Ruddick, William H., M. D., South Boston.
Russell, George, Woburn.
Russell, Hon. John E., Leicester.
Russell, Walter, Arlington.

Salisbury, William C. G., Boston.
Sanford, Oliver S., Hyde Park.
Sargent, Charles S., Brookline.
Saville, Richard L., Brookline.
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
Scorgie, James C., Cambridge.
†Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, J. Montgomery, Boston.
Shaw, Christopher C., Milford, N. H.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Siebrecht, H. A., New Rochelle, N. Y.
Simpkins, Hon. John, Yarmouthport.
Skinner, Francis, Boston.
Smith, Benjamin G., Cambridge.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Jamaica Plain.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco, Cal.
Smith, George O., Boston.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Snow, Miss Salome H., Brunswick, Me.
Spaulding, Edward, West Newton.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Sprague, Hon. Charles F., Brookline.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M. D., Roslindale.
Stewart, William J., Winchester.
Stone, Charles W., Boston.
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Sturgis, Russell, Manchester.
Sturtevant, E. Lewis, M. D., South Framingham.

Surette, Louis A., Concord.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Taft, John B., Cambridge.
Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G., M. D., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thompson, Leonard, Woburn.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Trepess, Samuel J., Spokane, Wash.
†Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Underwood, William J., Belmont.

Vander-Woerd, Charles, Waltham.
Vinal, Miss Mary L., Somerville.

Wainwright, William L., Braintree.
Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Edward C. R., Roxbury.
Walker, Miss Mary S., Waltham.
Walley, Mrs. W. P., Boston.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Washburn, Andrew, Hyde Park.
Watson, Benjamin
Plain.
Watson, Thomas A.,
Watts, Isaac, Waverl
Webber, Aaron D., B
Weld, Christopher M
Plain.
Weld, George W., Ne
Weld, Otis E., Boston
Weld, Richard H., Bo
West, Mrs. Maria L.,
Weston, Leonard W.,
Weston, Seth, Revere
Wheeler, Frank, Conc
Wheelwright, A. C., B
Whitcomb, William B
White, Francis A., Br
White, Joseph H., Br
Whitney, Arthur E., W
Whitney, Ellerton P.,
Whitten, Charles V.,
Whittier, Hon. Charle
Whittier, George E., G
Wilbur, George B., W
Wilder, Edward Baker
Wilder, Henry A., Ma
Willard, E. W., Newp
Willcutt, Levi L., Wes
Williams, Aaron D., B
Williams, Benjamin B
Williams, Philander, T
Willis, George W., Ch
Willis, Joshua C., Rox
Wilson, Col. Henry W
Wilson, William Powe
Winthrop, Robert C.,
Wood, William K., W
Woods, Henry, Boston
Wright, George C., W
Wyman, Oliver B., Sh

ANNUAL MEMBERS.

Members of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Abbott, Samuel L., M. D , Boston.
Allen, Charles L., Floral Park, N. Y.
Alles, William H., Hyde Park.
Anderson, George M., Milton.
Arnold, Mrs. Anna E., Roxbury.
Atkinson, Edward, Brookline.

Badlam, William H., Dorchester.
Barker, John G., Boston.
Benedict, Washington G., Boston.
Bigelow, Arthur J., Eastlake, Worcester.
Bigelow, Mrs. Nancy J., Southborough.
Bird, John L., Dorchester.
Bird, Mrs. Sarah Elizabeth, Roxbury.
Bliss, Benjamin K., East Bridgewater.
Bock, William A., North Cambridge.
Bolles, Matthew, Boston.
Bolles, William P., M. D., Roxbury.
Bouvé, Lander M., Brookline.
Boyden, Clarence F., Taunton.
Breck, Charles H., Newton.
Breck, Charles H. B., Brighton.
Brooks, George, Brookline.
Brown, David H., West Medford.
Butler, Edward, Wellesley.

Carpenter, Frank O., West Roxbury.
Carroll, James T., Chelsea.
Carter, Mrs. Sarah D. J., Wilmington.
Chase, Joseph S., Malden.
Chase, Leverett M., Roxbury.
Chase, Philip A., Lynn.
Cheney, Amos P., Natick.
Chubbuck, Isaac Y., Roxbury.
Clapp, Henry L., Roxbury.
Clark, John Spencer, Boston.
Clark, Joseph, Manchester.
Clark, Theodore M., Newtonville.
Clarke, Frederick E., Lawrence.
Collins, Frank S., Malden.
Comley, James, Lexington.
Coolidge, David H., Jr., Boston.
Coolidge, Sumner, Mount Auburn.
Cotter, Lawrence, Dorchester.
Cotting, Charles U., Boston.
Councilman, Prof. W. T., Boston.
Crosby, J. Allen, Jamaica Plain
Curtis, Joseph H., Boston.
Curtis, Louville, Tyngsborough.

Davis, Frederick, Boston.
Davis, Frederick S., West Roxbury.
Davis, Thomas M., Cambridgeport.
Dawson, Charles Jackson, Jamaica Plain.
Dimick, Orlendo W., Watertown.
Dolbear, Mrs. Alice J., College Hill.
Doran, Enoch E., Brookline.
Doyle, William E., East Cambridge.
Duffley, Daniel, Brookline.

Eaton, Warren E., Reading.

Endicott, Miss Charlotte M., Canton.
Ewell, Marshall F., Marshfield Hills.

Faxon, Edwin, Jamaica Plain.
Felton, Arthur W., West Newton.
Fenno, Warren, Revere.
Fisher, Sewall, Framingham.
Fitzgerald, Desmond, Brookline.
Fletcher, Fred W., Auburndale.
Forbes, William H., Jamaica Plain.
French, Charles G., Utica, N. Y.
Frost, Artemas, Belmont.
Frost, George, West Newton.
Frost, Varnum, Arlington
Fuller, T. Otis, Needham.

Gibbon, Mrs. James A., Brookline.
Gill, Mrs. E. M., Medford.
Gilman, Hon. Virgil C., Nashua, N. H.
Grant, Charles E., Concord.
Grew, Henry Sturgis, Boston.

Hall, Charles H., M. D., Boston.
Hall, Stacy, Boston.
Hall, William T., Revere.
Hallstram, Charles W., Boston.
Hargraves, William J., Jamaica Plain.
Harris, Miss Ellen M., Jamaica Plain.
Harris, Frederick L., Wellesley.
Harrison, Thomas, Melrose Highlands.
Hartwell, Samuel, Lincoln.
Hatfield, T. D., Wellesley.
Henshaw, Samuel, West Brighton, N. Y.
Hersey, Alfred H., Hingham.
Hersey, Edmund, Hingham.
Heustis, Warren H., Belmont.
Hewett, Miss Mary C., Canton.
Hill, J. Willard, Belmont.
Hobbs, George M., Boston.
Hollis, George, South Weymouth.
Horton, Herbert A., Brookline.
Houghton, George S., West Newton.
Howard, J. W., Som
Hubbard, F. Tracey,
Huston, Miss Kath
bury.

Ireland, Robert D., W

James, Robert Kent,
Jameson, G. W., Ea

Keith, Miss Mary I
D. C.
Kemp, William S., I
Kenrick, Miss Anna

Lancaster, Mrs. E. M
Lawrence, Henry S.,
Lee, William W., N
Lincoln, Miss Agnes
Lomax, George H., S
Lombard, Richard T
Loring, Charles G.,
Loring, John A., No
Loring, William C.,
Lothrop, Thornton K
Loud, Miss Mary E.,
Low, Hon. Aaron, H
Lowell, John, Newto

Manda, W. A., Sout
Manning, A. Chandl
Manning, J. Woodw
Martin, William J.,
Masten, Cornelius E
May, F. W. G., Bos
McDowell, Mrs. Ma
McLaren, Anthony,
McMullen, Edgar, I
Meriam, Horatio C.,
Merrill, John J., Ro
Milman, William, R
Moore, George D., A
Moseley, Frederick
Newbury.
Munson, Prof. W. M

Newton, John F., R
Nicholson, William,

Norton, Michael H., Boston.
Norton, Patrick, Boston.

Olmsted, Frederick Law, Brookline.

Park, William D., Boston.
Park, William P., West Boxford.
Parker, John, Newtonville.
Parker, Walter S., Reading.
Patterson, William, Quincy.
Peirce, George H., Concord.
Peterson, Ellis, Jr., Jamaica Plain.
Petremant, Robert, New York, N. Y.
Pickman, Dudley L., Boston.
Pigott, Thomas E., Winthrop.
Plimpton, Willard P., West Newton.
Power, Charles J., South Framingham.
Prichard, Joseph V., Dorchester.
Purdie, George A., Wellesley Hills.

Rich, Miss Ruth G., Dorchester.
Rich, William E. C., Roxbury.
Rich, William P., Chelsea.
Richards, Mrs. P. D., West Medford.
Robbins, Oliver R., Weston.
Robinson, Walter A., Arlington.
Ross, Charles W., Newtonville.
Ross, Henry Wilson, Newtonville.
Rothwell, James E., Brookline.

Saunders, Miss Mary T., Salem.
Sawtelle, J. M., Fitchburg.
Schmitt, Georg A., Boston.
Scott, Augustus E., Lexington.
Scudder, Samuel H., Cambridge.
Searles, E. F., Methuen.
Seaver, Edwin P., LL. D., Waban.
Sharples, Stephen P., Cambridge.
Shaw, Hon. Edward P., Newburyport.
Sheppard, Edwin, Lowell.
Smith, Archibald, Somerville.
Souther, Charles H., Jamaica Plain.
Southworth, Edward, Quincy.
Squire, Miss Esther A., North Cambridge.
Stearns, Mrs. Charles A., East Watertown.
Stearns, Charles H., Brookline.
Stevens, Miss Mary O., North Andover.
Stone, Joshua C., Watertown.
Storer, Charles, Providence, R. I.
Story, Miss Sarah W., Brighton.
Swan, Charles W., M. D., Boston.

Tailby, Joseph, Wellesley.
Talbot, Josiah W., Norwood.
Teele, William H., West Acton.
Terry, Rev. Calvin, North Weymouth.
Toby, Rufus T., Roxbury.
Travis, Charles B., Brighton.
Tyndale, Theodore H., Brookline.

Vaughan, J. C., Chicago, Ill.

Walsh, Michael H., Wood's Holl.
Warren, Samuel H., Weston.
Webster, Hollis, Cambridge.
Welch, Patrick, Dorchester.
Weld, Charles E., Roslindale.
Wells, Benjamin T., Newtonville.
Westwood, Thomas H., Jamaica Plain.
Wheeler, James, Brookline.
White, Maurice P., Roxbury.
White, W. Henry, Lowell.
Whitney, Joseph, Cambridgeport.
Whiton, Hon. Starkes, Hingham Centre.
Wilcox, George D., M. D., Providence, R. I.
Winter, William C., Mansfield.
Wolcott, Mrs. Henrietta L. T., Dedham.
Wood, Mrs. Anna D., West Newton.
Wood, Elijah A., West Newton.
Wood, E. W., West Newton.
Woodford, Joseph H., Boston.
Woods, Henry F., Boston.
Worthington, Roland, Roxbury.

Young, Arthur W., Hingham.
Young, Charles S., Newton Centre.
Young, E. Bentley, Boston.

Zirngiebel, Denys, Needham.

EXTRACTS FROM THE CONSTITUTION AND

SECTION XXII.

Life Members.

The payment of thirty dollars shall constitute a Life Me exempt the member from all future assessments, and any an having paid all dues, may become a Life Member by the paym dollars in addition thereto.

Annual Membership.

Every annual member, before he receives his diploma, or privileges of a member, shall pay the sum of ten dollars as an and shall be subject afterwards to an annual assessment of two

SECTION XXIII.

Withdrawal or Discontinuance of Membershi

Any member may withdraw from the Society, on giving Treasurer and paying the amount due from him. Any memb neglect for the space of two years to pay his annual assessme notice from the Treasurer, shall cease to be a member. T shall give notice of such withdrawals or discontinuances to who shall erase such members' names from the list.

The attention of Annual Members is particularly called to Se

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Joseph Maxwell, *elected in* 1830, *and* George W. Smith, *elected in* 1851.

Hon. George S. Boutwell, Groton.
H. W. S. Cleveland, Chicago, Ill.
Hon. Joseph S. Fay, Wood's Holl.
Joseph Jefferson, Buzzard's Bay.
Major L. A. Huguet-Latour, M. P., Montreal, Canada.
Col. Theodore Lyman, Brookline.
Joseph Maxwell, Rio Janeiro, Brazil.
Donald G. Mitchell, New Haven, Conn.
Hon. J. Sterling Morton, Secretary of Agriculture, Washington, D. C.
Baron R. Von Osten Sacken, Heidelberg, Germany.
Samuel B. Parsons, Flushing, N. Y.
Samuel R. Payson, Boston.
George W. Smith, Boston.

CORRESPONDING MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly reporting to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Alexander Burton, *elected in* 1829, S. Reynolds, M. D., 1832, *and* Francis Summerest (or Summerer), 1833.

Édouard André, Editor in Chief of the Revue Horticole, Paris, France.

Professor L. H. Bailey, Cornell University, Ithaca, N. Y.

Charles Baltet, Président de la Société Horticole, Vigneronne, et Forestière de l'Aube, Troyes, France.

Napoleon Baumann, Bolwiller, Alsace.

D. W. Beadle, 303 Crawford St., Toronto, Ontario.

Professor William J. Beal, Agricultural College, Michigan.

Prosper J. Berckmans, President of the American Pomological Society, Augusta, Ga.

Charles E. Bessey, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.

Dr. Ch. Bolle, Berlin, Prussia.

John Croumbie Brown, LL.D., Haddington, Scotland.

Professor J. L. Budd, Secretary of the Iowa Horticultural Society, Ames.

William Bull, Chelsea, England.

Alexander Burton, United States Consul at Cadiz, Spain, Philadelphia.

Isidor Bush, Bushberg, Jefferson Co., Mo.

George W. Campbell, Ex-President of the Ohio State Horticultural Society, Delaware, O.

Maxime Cornu, Director of the Jardin des Plantes, Paris, France.

Benjamin E. Cotting, M. D., Boston.

Daniel T. Curtis, Dorchester.

Rev. H. Honywood D'Ombrain, Westwell Vicarage, Ashford, Kent, England.

Robert Douglas, Waukegan, Ill.

Malcolm Dunn, Dalkeith, Scotland.

W. T. Thiselton Dyer, C. M. G., F. R. S., Director of the Royal Botanic Gardens, Kew, England.

PARKER EARLE, President of the American Horticultural Society, Cobden, Ill.

GEORGE ELLWANGER, Rochester, N. Y.

HENRY JOHN ELWES, F. L. S., F. Z. S., Colesborn, Andoversford, Gloucestershire, England.

WILLIAM G. FARLOW, M. D., Professor of Cryptogamic Botany, Harvard University, Cambridge.

B. E. FERNOW, Chief of the Division of Forestry, Department of Agriculture, Washington, D. C.

HON. ROBERT W. FURNAS, Ex-President of the Nebraska State Horticultural Society, Brownville.

CHARLES A. GOESSMANN, Ph. D., LL. D., Chemist of the Hatch Experiment Station of the Massachusetts Agricultural College, Amherst.

GEORGE L. GOODALE, M. D., Professor of Botany, Harvard University, Cambridge.

OBADIAH B. HADWEN, President of the Worcester County Horticultural Society, Worcester.

PROFESSOR BYRON D. HALSTED, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N. J.

J. H. HART, Superintendent of the Botanic Garden, Trinidad.

DR. F. M. HEXAMER, Editor American Agriculturist, New York.

ROBERT HOGG, LL. D., Editor of the Journal of Horticulture, London.

J. C. HOLDING, Ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.

REV. S. REYNOLDS HOLE, Rochester, England.

SIR JOSEPH HOOKER, K. C. S. I., The Camp, Sunningdale, England.

JOSIAH HOOPES, West Chester, Pa.

GEORGE HUSMANN, Napa, Cal.

WILLIAM J. JOHNSON, M. D., Fort Gaines, Ga.

CHARLES JOLY, Vice-President of the Société Nationale d'Horticulture de France, Paris.

DR. GEORGE KING, Superintendent of the Royal Botanic Garden, Calcutta.

PROFESSOR WILLIAM R. LAZENBY, Secretary of the Agricultural Experiment Station, Columbus, O.

MAX LEICHTLIN, Baden-Baden, Germany.

G. F. B. LEIGHTON, President of the Norfolk Horticultural and Pomological Society, Norfolk, Va.

VICTOR LEMOINE, Nancy, France.

J. LINDEN, Ghent, Belgium.

T. T. LYON, President of the Michigan Horticultural Society, South Haven.

DR. P. MACOWAN, Director of the Botanic Garden, Cape Town, Africa.

DR. MAXWELL T. MASTERS, Editor of the Gardeners' Chronicle, London.

GEORGE MAW, Benthal, Kinley, Surrey, England.

T. C. MAXWELL, Geneva, N. Y.

THOMAS MEEHAN, Germantown, Pa.

DR. CHARLES MOHR, Mobile, Ala.

DR. DANIEL MORRIS, C. M. G., D. Sc., M. A., F. L. S., Assistant Director of the Royal Botanic Gardens, Kew, England.
CH. NAUDIN, Antibes, France.
GEORGE NICHOLSON, Curator of the Royal Botanic Gardens, Kew, England.
WILLIAM PAUL, Waltham Cross, London, N.
PROFESSOR D. P. PENHALLOW, Director of the Botanic Garden, Montreal, Canada.
HENRY PROBASCO, Cincinnati, O.
P. T. QUINN, Newark, N. J.
CAVALIÈRE ENRICO RAGUSA, Palermo, Sicily.
D. REDMOND, Ocean Springs, Miss.
S. REYNOLDS, M. D., Schenectady, N. Y.
WILLIAM ROBINSON, Editor of The Garden, London.
EDGAR SANDERS, Chicago, Ill.
WILLIAM SAUNDERS, Department of Agriculture, Washington, D. C.
WILLIAM R. SMITH, Curator of the Botanic Garden, Washington, D. C.
ROBERT W. STARR, Port William, N. S.
DR. JOSEPH STAYMAN, Leavenworth, Kan.
WILLIAM A. STILES, Editor of Garden and Forest, Deckertown, N. J.
WILLIAM SUMNER, Pomaria, S. C.
FRANCIS SUMMEREST.
WILLIAM TRELEASE, Director of the Missouri Botanic Garden, St. Louis.
DR. MELCHIOR TREUB, Director of the Botanic Garden, Buitenzorg, Java.
H. J. VEITCH, Chelsea, England.
HENRY L. DE VILMORIN, Secretary of the Société Nationale d'Agriculture de France, Paris.

CONTENTS.

PAGE

BUSINESS MEETING, May 2, 1896; Memorial of C. M. Atkinson, pp. 191, 192; Four members elected 192

BUSINESS MEETING, June 6; No quorum 193

BUSINESS MEETING, July 11; Decease of M. Léon Say and Andrew S. Fuller announced, p. 193; Letter from Mrs. C. M. Atkinson, 193; Vote concerning compensation of committees, 193; Four members elected 193

BUSINESS MEETING, August 1; Nominating Committee appointed . . . 194

BUSINESS MEETING, September 5; Report of Nominating Committee made . 194

BUSINESS MEETING, October 3; Annual Election, pp. 195, 196, 197; Report on compensation of committees, 195; Decease of William Robinson announced, 196; Seventeen members elected 196

BUSINESS MEETING, November 7; Memorial of A. S. Fuller, pp. 197, 198; Memorial of William Robinson, 198, 199; Appropriations for 1897, 200; Labelling Fungi, 200, 201; Two members elected 201

BUSINESS MEETING, December 5; Reports of Committee of Arrangements, Library, Establishing Prizes, presented, p. 201; Partial report from Committee on Gardens and Flowers, 201; Decease of S. G. Damon announced, 202; Letter concerning appointment of Secretary of Agriculture, 202; Seven members elected 202

BUSINESS MEETING, December 12; Reports of Committees on Fruits, Flowers, Gardens, and School Gardens and Children's Herbariums, presented, pp. 202, 203; Report of Secretary and Librarian read, 203; Vote concerning warrants for service on committees 203

REPORT OF COMMITTEE ON PLANTS; Introduction, p. 204; Spring Exhibition, 204, 205; May Exhibition, 205; Rose and Strawberry Exhibition, 205, 206; Annual Exhibition of Plants and Flowers, 206; Chrysanthemum Show, 206, 207; Financial Statement, 207; Prizes and Gratuities awarded, 208-216

REPORT OF COMMITTEE ON FLOWERS; Introduction, pp. 217, 218; Spring Exhibition, 218, 219; May Exhibition, 219, 220; Rhododendron Show, 220; Rose and Strawberry Exhibition, 221; Annual Exhibition of Plants and Flowers, 223, 224; Chrysanthemum Show, 224, 225; Saturday Exhibitions, 217, 218, 219, 220, 221, 222, 223, 224, 225; Financial Statement, 226; Prizes and Gratuities awarded 227-245

REPORT OF COMMITTEE ON FRUITS, pp. 246-248; Prizes and Gratuities awarded . 249-263

REPORT OF COMMITTEE ON VEGETABLES, pp. 264-266; Prizes and Gratuities awarded 267-281

REPORT OF COMMITTEE ON GARDENS; Introduction, p. 282; David
Estate, 282-285; Chrysanthemums, 286; Mrs. Benjamin P. Cheney's
anthemums, 286, 287; Walter Hunnewell's Chrysanthemums, 2
William Nicholson's Chrysanthemums, 289, 290; James Comley's
anthemums, 290-292; Violets, 292, 293; David Nevins's Violets, 2
James Comley's Violets, 294; Carnations, 294, 295; Fruit Gard
Vegetable Gardens, 295; Statement of E. C. Lewis, 296, 297; Wa
Heustis's Vegetable Garden, 297; Bussey Institution, 297-300;
House at Oakmont, 300-302; William Nicholson's Forced Tomat
Winter Forcing of Tomatoes, 303, 304; Awards . . . . .

REPORT OF THE COMMITTEE ON ARRANGEMENTS . . . . . .

REPORT OF THE COMMITTEE ON SCHOOL GARDENS AND CHILDREN'
BARIUMS; George Putnam School, Roxbury, pp. 308-310; Childre
bariums, 311-313; Financial Statement, 313; Prizes and Gratuities a

REPORT TO THE STATE BOARD OF AGRICULTURE . . . . . .

REPORT OF THE COMMITTEE ON THE LIBRARY . . . . . .

REPORT OF SECRETARY AND LIBRARIAN . . . . . .

REPORT OF TREASURER AND FINANCE COMMITTEE . . . . . .

MOUNT AUBURN CEMETERY . . . . . .

OFFICERS AND STANDING COMMITTEES FOR 1897 . . . . . .

MEMBERS OF THE SOCIETY; Life, pp. 336-342; Annual, 343-345; Honors
Corresponding . . . . . .

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS . . . . .

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1896.

PART III,

BEING THE LIST OF

ACCESSIONS TO THE LIBRARY

DURING THE YEAR.

BOSTON:
PRINTED FOR THE SOCIETY.
1899.

LIBRARY ACCESSIONS, 1896.

In the following list the books purchased from the income of the Stickney Fund are marked S. F., and those purchased from the Society's Library Appropriation, L. A. All others were received by donation and exchange, and the source whence received is given in every instance when known.

The measurements of the books are in inches and tenths of an inch, giving first the height, next the thickness, and lastly the width. When a pamphlet is less than one-tenth of an inch in thickness the place of that dimension is supplied by a dash.

GENERAL HORTICULTURE.

Slade, Daniel Denison. The Evolution of Horticulture in New England. Half light brown calf, 7.×.8×4.5, pp. v, 180. New York and London, and New Rochelle, N. Y.: 1895. The Author.

Horticultural Directory and Year Book for 1896. 37th year of publication. Blue-green paper, 7.×.9×4.8, pp. 512. London: (1896). S. F.

Garden Oracle and Illustrated Floricultural Year Book, 1896. By the Editor of "The Gardeners' Magazine." 38th year of publication. Half red cloth, 7.3×.8×5., pp. 276; 1 colored plate, cuts. London: (1896). S. F.

Bailey, L. H. Plant-Breeding. Being five lectures upon the amelioration of domestic plants. (Garden-Craft Series). Light green linen, 7.×.7×5.8, pp. xii, 293; 20 cuts. New York and London: 1895. S. F.

Hibberd, Shirley, F. R. H. S. Profitable Gardening; a practical guide to the culture of vegetables, fruits, and other useful out-door garden products; intended for the use of amateurs, gentlemen's gardeners, allotters, and growers for market. New edition. Green cloth, 7.3×.8×5., pp. iv, 296; cuts. London: n. d. S. F.

Sanders, T. W., F. R. H. S. An Encyclopædia of Gardening. A Dictionary of Cultivated Plants, etc. Second Edition. Olive-green cloth, 7.4×1.3×5., pp. 435. London: 1896. S. F.

The Garden that Paid the Rent. Boards, salmon-color, 7.3×.5×4.7, pp. 127. London: 1860. S. F.

Lazenby, William R. Horticulture and Health. Address by William R. Lazenby, Vice-President, Section 1, of the American Association for the Advancement of Science at the Buffalo Meeting, August, 1896. [Proc. A. A. A. S., Vol. XLV, 1896.] Pamph., drab, 9.6×—×6.1, pp. 18. The Author.

GENERAL HORTICULTURE, *continued.*

(**Manuscript** Journal of Gardening Operations. Aug. 10, 1822 to May 8, 1836.) Red flexible leather covers, 7.4×.3×4.5, pp. (78). Mrs. J. F. Pratt.

HORTICULTURAL JOURNALS.

Northwest Horticulturist, Agriculturist, and Dairyman. Vol. 9. Nos. 1–12. 12 pamphs., 15.×—×11., pp. 191; cuts. Tacoma and Seattle, Washington: 1896. C. A. Tonneson, Secretary State Board of Horticulture, Tacoma, Washington.

L'Horticulteur Français de mil huit cent cinquante et un. Journal des Amateurs et des intérêts horticoles. Rédigé par F. Herincq. Vols. 1 – (21). 1851–1872. Half black leather, 9.4×1.×6.2, colored plates, cuts. Paris: 1851–1872. S. F.

HORTICULTURAL SOCIETIES.

New Hampshire Horticultural Society. Premium List for the Third Annual Exhibit, Concord, Sept. 22–24, 1896, together with the Rules and Regulations of the Society. Pamph., drab, 7.6×—×5.4, pp. 17. Concord, N. H.: 1896. W. D. Baker, Secretary.

Melrose Amateur Gardeners' Society. Rules concerning the Exhibition of Sept. 7, 1896. List of Prizes, etc. Pamphs., 5.7–8.6×—×4.3–5.5. George H. Wills, President.

Worcester County Horticultural Society. Schedule of Premiums, for the year 1896. Pamph., 9.2×—×5.7, pp. 31. Worcester: 1896. E. W. Lincoln, Secretary.

Rhode Island Horticultural Society. Chrysanthemum Exhibition, Providence, R. I., Nov. 1896. Premium List. Pamph., 8.3×—×5.5, pp. (4). C. W. Smith, Secretary.

Western New York Horticultural Society. Proceedings of the Forty-first Annual Meeting, held at Rochester, Jan. 22 and 23, 1896. Pamph., terra-cotta, 8.3×.2×5.7, pp. 155. Rochester: 1896. John Hall, Secretary and Treasurer.

New Jersey State Horticultural Society. Proceedings at its Twenty-first Annual Session, held at Trenton, N. J., Jan. 2 and 3, 1896. Pamph., gray, 8.9×.4×5.8, pp. 164, (2). Mount Holly, N. J.: 1896. Henry I. Budd, Secretary.

Pennsylvania Horticultural Society. Transactions. Vol. 1. Including the papers read from December, 1894, to December, 1895, with a description of the exhibition of 1895, and of the ceremony of the laying of the cornerstone of the new building. Pamph., drab, 9.×.4×5.8, pp. 152; 2 plates. Philadelphia: 1896.

Schedule of Prizes at the Annual Exhibition of Chrysanthemums, Flowers, Plants, Fruit and Vegetables, Nov. 10–14, 1896. To which is appended a list of premiums offered for competition at the

monthly meetings of the Society during 1896. Pamph., light green, 9.2×.1×5.9, pp. 27. Philadelphia: 1896.

Horticultural Hall, Philadelphia. Plans of the Building and Statements as to its Erection. Pamph., tea, 7.5×.1×5.3, pp. 21; 2 plates, plans. Philadelphia: 1894. David Rust, Secretary.

Peninsula Horticultural Society. Transactions. 2d, and 6th to 9th Annual Sessions. January, 1889, and January, 1893—January, 1896. 5 pamphs., tea, terra-cotta, etc., 8.7–9.2×.2×6., pp. 86, 88, 82, 102, 110. Wilmington and Dover, Del.: (1889) and 1893–1896. Prof. Wesley Webb.

North Carolina State Horticultural Society. Sixteenth Annual Meeting, Southern Pines, N. C., August 20–21, 1896. Program. Pamph., blue, 8.5×—×5.4, pp. (4). Gerald McCarthy, Secretary.

Ohio State Horticultural Society. Twenty-ninth Annual Report. For the year 1895–6. Pamph., pink, 9.4×.4×6.5, pp. 244; 1 plate, cuts. W. W. Farnsworth, Secretary.

Columbus (Ohio) Horticultural Society. Annual Report. For the year ending December 31, 1895. Containing Constitution, List of Members, and Quarterly Journal. Vol. 10. Prepared by J. S. Hine, Secretary. Dark green cloth, 9.×.7×6., pp. viii, 172, (3); 2 plates, 1 portrait. Columbus: 1896. The Secretary.

Indiana Horticultural Society. Transactions for the year 1895, being a report of the Thirty-fifth Annual Meeting held in Indianapolis, Dec. 3–5, 1895, together with reports of the Summer Meeting held at South Bend, August 21 and 22, etc. Black cloth, 9.1×.5×6., pp. 175. Indianapolis: 1896. James Troop, Secretary.

Chicago Horticultural Society. Annual Fall Exhibition, Nov. 10–14, 1896. Preliminary List, Revised List, Programme and Revised List. 3 pamphs., 8.7×—×5.8, pp. (12), (12), 24. Edgar Sanders.

Minnesota State Horticultural Society. Annual Report. Vol. XXIII. 1895. Embracing the Transactions of the Society from Jan. 8, 1895, to Dec. 3, 1895, including the eleven numbers of "The Minnesota Horticulturist" for 1895. Black cloth, 9.3×1.3×6.3, pp. 505; 9 plates, cuts. Minneapolis: 1895. A. W. Latham, Secretary.

Missouri State Horticultural Society. Thirty-eighth Annual Report. Meetings at Willow Springs, June 4–6, and Neosho, December 3–5, 1895. L. A. Goodman, Secretary. Red cloth, 9.3×1.×6., pp. 428, iii; frontispiece, 3 plates, cuts. Jefferson City: 1896. L. A. Goodman, Secretary. [10 copies.]

Kansas State Horticultural Society. Fourth Biennial Report, containing the Proceedings of Annual Meeting held at Fort Scott in December, 1894, and Annual Meeting held at Lawrence in December, 1895. Vol. XX. Claret-brown cloth, 9.3×.4×6.2, pp. 100; 1 portrait. Topeka: 1896. Edwin Taylor, Secretary.

HORTICULTURAL SOCIETIES, *continued.*

Royal Horticultural Society.

Journal. Edited by the Rev. W. Wilks, M. A., Secretary, and Mr. John Weathers, Assistant Secretary.

Vol. XIX, Part 3. March, 1896. pp. 345–460, ci–ccxxxvi.

Vol. XX, Part 1. August, 1896. pp. 76, cxxviii; 14 cuts.

2 pamphs., gray, 8.4×.5×5.5. London: 1896. The Secretary.

Report of the Council for the year 1895–96, with List of Fellows, Associates and Affiliated Societies.

Pamph., gray, 8.2×.2×5.5, pp. 86. London: (1896). The Secretary.

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Wisconsin State Historical Society. 43d Annual Meeting, Dec. 12, 1895. Reuben G. Thwaites, Secretary.

American Congregational Association. Forty-third Annual Report of the Directors. Boston: 1896. The Association.

PERIODICALS PURCHASED.

ENGLISH. — Gardeners' Chronicle.
Gardeners' Magazine.
Journal of Horticulture and Cottage Gardener.
The Garden.
Gardening Illustrated.
Gardening World.
Orchid Review.
Curtis's Botanical Magazine.
Journal of Botany.
Nature.

FRENCH. — Revue Horticole.
Lyon Horticole.
Revue des Eaux et Forêts.
Répertoire de Législation et de Jurisprudence forestières.
Journal des Roses.

BELGIAN. — Illustration Horticole.
Revue de l'Horticulture Belge et Étrangère.
Journal des Orchidées.

GERMAN. — Botanische Zeitung.

PERIODICALS PURCHASED, *continued.*

AMERICAN.—Country Gentleman.
Garden and Forest.
Meehan's Monthly.
American Naturalist.
American Journal of Science.

PERIODICALS RECEIVED IN EXCHANGE.

Canadian Horticulturist.
Gardening.
American Gardening.
Amateur Gardening.
National Nurseryman.
Weiner Illustrirte Garten-Zeitung.
Vick's Illustrated Monthly Magazine.
The Mayflower.
Success with Flowers.
Southern Florist and Gardener.
California Garden.
American Florist.
Florists' Exchange.
Boston Flower Market.
Baltimore Cactus Journal.
Sharon Cactus Guide.
Green's Fruit Grower.
Strawberry Culturist.
Grape Belt.
Montana Fruit Grower.
Gardens and Gardening.
Botanical Gazette.
Erythea.
Pittonia.
West American Scientist.
Maine Farmer.
New England Farmer.
Massachusetts Ploughman.
American Cultivator.
New England Homestead. (Eastern Edition of American Agriculturist.)
Rural New-Yorker.
Farm Journal.
California Cultivator and Poultry Keeper.
National Stockman and Farmer.
Germantown Telegraph.
Maryland Farmer.
Prairie Farmer.

PERIODICALS RECEIVED IN EXCHANGE, *continued*.

The Industrialist.
Irrigation Age.
Garden and Field (Adelaide, South Australia).
Park and Cemetery.
Boston Daily Advertiser.
Boston Morning Journal.
Boston Daily Globe.
Boston Evening Transcript.
Boston Daily Evening Traveler.
Boston Times.

BOOKS, Etc., WANTED

BY THE

MASSACHUSETTS HORTICULTURAL SOCIETY.

☞ *Persons having any of the books in the following list to dispose of will oblige by addressing the "Librarian of the Massachusetts Horticultural Society, Horticultural Hall, 101 Tremont St., Boston."*

Album de Pomologie, Vol. 2.

Amateur World of Horticulture. Title-page and Index to Vol. II.

American Agricultural Annual. Nos. 1 and 2, 1867 and 1868.

American Agricultural Association Review and Journal, January, 1882.

American Agriculturist. 4to. Vols. 11–15 inclusive. Vol. 23, No. 7.

American Cemetery Superintendents, Association of. Proceedings of 8th Annual Convention, 1894.

American Farmer. Fifth series. Vol. 3, Nos. 7–12, January to June, 1862, and the succeeding volumes to 1873, inclusive, also the numbers for October and December, 1877, and April to December, inclusive, 1878.

American Forestry Association. (a) Proceedings of the special meeting at Washington, D. C., May, 1884, and 3rd Annual Meeting at Saratoga, N. Y., September, 1884. (b) Proceedings of 6th Annual Meeting held in Springfield, Ill., — final report, not "preliminary newspaper report." (c) Proceedings of the 8th Annual Meeting held at Philadelphia, October, 1889.

American Institute. Reports previous to 1843; 1844 and 1845, and all later than 1871–72.

American Journal of Science. (Silliman's Journal.) Vols. 11–16, 1st series.

Asa Gray Bulletin. No. 1, April (?) 1893.

Asociacion Rural del Uruguay — Revista. Vols. 1–11, and Vol. 12 (except No. 15).

Association pour la Protection des Plantes, Bulletin de l'. Nos. 1–8. 1883–1890. Genève.

Bolton's Filices Britannicæ. Part 2. 4to. Huddersfield: 1790.

Bon Jardinier, Le. 1831 to 1835 inclusive, 1837 to 1840, 1842 to 1850, 1852 to 1855, 1858, 1859, 1861, 1873.

Boston Flower Market and New England Florist. Vol. 1, No. 2.

Boston Park Reports. City Documents, Nos. 111, 1880, and 93, 1881.

British Guiana Botanic Garden. Annual Reports. [Have only 1886.]

Brongniart, A. T. Mémoire sur la génération et le developpement de l'embryon dan les végétaux phanérogames. The text.

Brooklyn, N. Y., Park Report. 27th, for 1887.

Brown, Robert, of Campster. Horæ Sylvanæ. All but the first four signatures (pp. 1–64).

Buc'hoz. Traité historique des plantes. [Our copy has very few plates. Should be 139.]

Bulliard, P. Herbier de la France. (a.) L'histoire des plantes vénéneuses, etc., (the edition with 72 colored plates). (b.) L'histoire des plantes alimentaires. (c.) L'histoire des plantes propre au meilleur fourrage. (d.) L'histoire des plantes utiles dans les arts, etc. [Also] Dictionnaire élémentaire de botanique, (which is an introduction to the whole work).

California Agricultural Society. Reports for 1864, '65, '66, '67, '74, '76, '77, '81, '86. Also Reports previous to that for 1863 (being reports of the Society previous to its re-organization).

California Horticulturist. Vols. 7 and 8, 1877 and 1878, and Nos. 2 and 3, February and March, of Vol. 9, 1879.

California Olive Industry. 1st Report, (1891?)

California State Board of Forestry. First Biennial Report. 1885–'86.

Christie, Thomas. New Commercial Plants. No. 12.

Columbia College, Contributions from the Herbarium of.

No. 4. A List of the Plants colleeted by Miss Mary B. Croft, at San Diego, Texas. (Except "Additions.")

No. 12. The Genus Eleocharis, etc.

No. 23. The American Species of the Genus Anemone, etc.

No. 34. The North American Species of Lespedeza.

Cosson et Germain. Flore des environs de Paris. Atlas to edition of 1845.

Country Gentleman. Vol. 2, No. 27, July 7, 1853.

Debeaux, O. Contributions a la flore de la Chine. Fasciculus 4.

Du Breuil, A. The 2nd, 3rd, and 4th parts, (if published), of the "Cours d'Arboriculture," 6th ed.

Farm and Garden. July and subsequent numbers. New York: 1853.

Fielding, H. B, assisted by George Gardner. Sertum plantarum. All that was published of Vol. II.

Florists' Exchange. Vol. I. Vol. II, Nos. 2 and 7.

Florists' Journal, 1840–1847.

Flower Garden, The. Published by Beach and Son, Brooklyn. N. Y. July, 1874. American Garden, January, 1878, and October, 1879.

Forest Leaves. Nos. 6–9, (1888) of Vol. 1, and No. 1, (also called No. 11,) January, 1889, of Vol. II.

Fruit Garden Display'd, The, setting forth the several varieties of fruit ripe in every month of the year, etc. [We have the months of June, July, and August, and want the remaining months.]

Gardener, The. A magazine of Horticulture and Floriculture. Edited by David Thomson. Index to the volume for 1878.

Georgia Horticultural Society. Proceedings of the 4th and 7th **Annual** Meetings.

Grape Belt, The. Vol. 1. Nos. 5, 18, 20, and 24, 1893.

Harvard University Library. Bibliographical Contributions. No. 9 (**Goodale** — Floras of Different Countries). No. 25 (Farlow and Trelease — **List** of Works on North American Fungi).

Highland Agricultural Society, Prize Essays of the, 1st Series, 1800-**1826.** 6 vols.

Horticultural Times and Covent Garden Gazette. Vol. 1, No. 1 and **title-page** and index; Vol. 2, title-page and index; Vol. 12, No. 311 and **title-page** and index; Vol. 14, title-page and index; Vol. 15, title-page **and** index; Vol. 16, title-page and index; Vol. 17, title-page and index, **and** all later than Vol. 17, No. 404.

Illinois Entomological Reports; First, by B. D. Walsh, for 1867.

Illinois Horticultural Society. Transactions of 1st to 4th Annual **Meetings.**

Indiana Horticultural Society. Transactions at the first eight ses-**sions,** previous to 1870, except the 3d, 5th, 6th, and 9th for 1864, 1866, **1867,** and 1870.

Industrialist. Vols. 1–14, and Nos. 1–17 of Vol 15.

Iowa Forestry Annual,— all but No. 5, 1879.

Iowa State Horticultural Society. Reports previous to 1867; also **1868,** 1869, 1871, and 1874.

Irrigation Age. Vols. 1–4, inclusive; Vol. 5, Nos. 2–5 and 8, June–**September** and December, 1893; Vol. 9, No. 5, May, 1896; Vol. 11, Nos. **4–9,** April–September, 1897.

Japanese Horticultural Society. Journal. Nos. 1, 2, 5–8, 43–51, **57, 68, 76, 79, 85,** and all later than No. 87, November, 1898.

Jaume Saint-Hilaire, J. H. Plantes de la France. Vols. 5–10.

Kansas State Board of Agriculture. 1st, 2d, and 3d Annual Reports, **for** 1872 (?), 1873 (?), and 1874 (?), and 2d, 3d, 4th, and 8th Biennial **Reports,** for 1879–80, 1881–82, 1883–84, and 1891–92.

Kirwan, C. de. Les Conifères indigènes et exotiques, etc. Tome I.

La Marck's Tableau encyclopédique et méthodique des trois règnes **de la nature.** Botanique. 3 vols. and Supp. (text), and plates 901–1,000.

L'Heritier, C. L. Stirpes Novæ. Fasc. 5 and 6, pp. 103–184, plates **49–84.**

Lincoln Park (Chicago). Reports for 1881–2 to 1885–6. Also all **previous** to 1879–80.

Louisiana State Agricultural Society. Proceedings of 1st to 4th, and **11th** Annual Sessions (1887–90) and 1897.

Luxembourg, Société botanique du Grand-Duché de, Recueil des **Mémoires** et des Travaux publiés par la. Nos. 1–10, [1867 to 1884?]

Macfadyen, J. Flora of Jamaica. Vol. II. (Only Rosaceæ to Ara-**liaceæ** were published).

Maryland Farmer. Vol. XII, No. 3, March, 1875.

Massachusetts Agricultural College. 1st, 2d and 3d Annual Reports.

Massachusetts Fruit Growers' Association. 1st and 2d Annual Reports.

Maund, B., and J. S. Henslow. The Botanist. Vol. 5.

Maximowicz, C. J. Diagnoses plantarum novarum Asiaticarum. I–IV and all later than VII (if any such were published.)

Mayflower, The. Vol. 1; Vol. 2, Nos. 7–10: Vol. 3, No. 9; Vol. 4, No. 12; Vol. 5, Nos. 2, 3, 4, 6, 9 and 10.

Michaux's North American Sylva. Paris: 1819. Vols. 1 and 3.

Michigan Board of Agriculture. 1st Report (n.s.), for 1862; 22d Report, for 1883; Report for 1893 (2 copies)

Miller, Philip. The Gardeners' Dictionary, 1st, 7th, and 8th folio editions

Minnesota Academy of Natural Sciences. Bulletin. Vol 1, Parts 1, 2, and 4.

Minnesota Horticultural Society. Vol. 9, for 1891.

Missouri Horticultural Society. Reports previous to the 23d, for 1880, except that of the 5th Meeting, in 1864.

Montana Fruit Grower. Vol. 1. Nos. 2, 7, 9 and 10, 1895–96.

Murray, Andrew, on the Synonomy of Various Conifers, all but Part 1.

——— ——. Notes upon California Trees, all but Part 1.

Murray, Lady Charlotte. The British Garden. Vol. 2, 2d ed. Bath, 1799.

Nebraska Horticultural Society. Transactions other than 1871, 1872, 1877–78, and 1879.

Nebraska State Board of Agriculture. Reports for 1868 (1st), '70, '71, '72, 74–'78, '80–'82, '88, '90.

Nees von Esenbeck, C. G. Naturgeschichte der Europäischen Lebermoose. Vols. 3 and 4.

New England Farmer 4to. Vol 7, No. 27, pp. 295 and 296; Vol. 8, No. 49, pp. 391 and 392

New England Farmer. Folio. No. 10, of Vol. 73, for March 10, 1894.

New Jersey Forestry, Reports on. (From Reports of N. J. Geological Survey). For 1896 and all later, and also all previous to 1894.

New Jersey Horticultural Society. Annual Reports 1st, 5th, and 14th sessions, 1876, 1883, and 1888.

New York Farmer. Vol. 3, New Series, 1835, pp. 33–64.

New York State Agricultural Society. Journal. Vol. 13, Nos. 10, 11, and 12. Vol. 14, Nos. 3, 5, 7, and 9–12. Vol. 15, Nos. 3, 4, 6, 7, and 12. Vol. 16, No. 2; and the whole of Vols. 17, 18, and 19.

New York State Agricultural Society. Report for 1887.

New York State Land Survey. Report on Progress . . . transmitted to the Legislature, (February or March), 1891.

Niagara, State Reservation at. 5th Annual Report, for the year 1888.

Norsk, Havetidende. 1st year.

North Carolina Agricultural Society. All Annual Reports between that for 1885 and the 13th for 1893.

North Carolina Horticultural Society. 2d–12th Annual Reports.

Northern Gardener, The. Vols. 1–3; Vol. 5, title-page and index; Vol.

6, title-page and index; and its successor, British Gardening, Vol. 8, 4 plates (in Nos. 219, 220, 227 and 229), and all later than Vol. 10, No. 266.

Northwest Horticulturist. Vols. 1–4.

Ohio State Board of Agriculture. Annual Reports: 1st–3d, 1846–1848; 6th–21st, 1851–1866; 23d–34th, 1868–1879.

Ontario Department of Agriculture. Bureau of Industries. 1st to 4th Annual Reports, 1882–1885.

Ontario Fruit Growers' Association. Reports previous to 1869 and 2d Report, 1871.

Ontario Permanent Central Farmers' Institute. Report of 1st Annual Meeting.

Oregon State Board of Horticulture, 3d Biennial Report, 1895.

Orléans et du Loiret, Société d' Horticulture d'. Bulletin. 1st and 2d Series.

Ortega, C. G. Novarum aut rariorum plantarum horti Matritensis, etc. Decades 5–10 inclusive.

Ortolano, L'. October and November numbers for 1864. Trieste.

Our Country Home. Vol. 5, No. 4; Vol. 8, No. 4; Vol. 9, Nos. 6 and 9; Vol. 10, Nos. 8, 10, 11, and 12.

Pallas, P. S. Flora Rossica. Vol. 2, Part 1.

Pennsylvania Department of Agriculture. Bulletins 1–7, 9–26.

Pennsylvania Fruit Growers' Societv. Reports previous to 1867.

Phytologist, The. General Index to the 2d Series.

Piper, R. U., M.D. The Trees of America. No. 3. 4to. Boston: 1858.

Plenck, J. J. Icones plantarum medicinalium, etc. Vols. 4 to 8.

Plow, The. Vol. 1, No. 1. New York: 1852.

Pomologie Française, La. Series 1 to 3, inclusive.

Purdy's Fruit Recorder. Vol. 1, 1869; Vols. 1–3 (2d ser.?), 1891–93; and also 1874 wants Nos. 5 and 6; 1878, No. 6; 1894, Nos. 2 and 8–12; 1895, Nos. 2–12.

Queensland Department of Agriculture. Bulletins. 1st Series 2, 4, 7, 10 and 14. 2d Series 12, and all later than 13.

Rafinesque, C. S. Atlantic Journal, Nos. 1, 4, 5, 6, 7, and 8. Philadelphia, 1832, 1833.

——— — —. Autikon Botanikon, Parts 2, 4, and 5, being Centuries 6–10, 16–20 and 21–25. Philadelphia: 1815–1840 (?)

——— — —. New Flora of North America. Parts 1, 2, and 3. Philadelphia, 1836.

Revue horticole. First Series, Vols. 1–3, Paris: 1829–1840; Second Series, Vols. 1–5, 1841–1846.

Rhode Island Board of Agriculture. 1st and 4th Annual Reports.

Ruiz et Pavon. Flora Peruviana et Chilensis, Vol. 4.

Rural Californian. All after March, 1895.

Rural New Yorker. Vols. 1–9, 13–18, 24–48; also No. 23, Dec. 9, 1871, of Vol. 23.

Sarthe, Bulletin de la Société d' Horticulture de la. All previous to 1870, being Vols. 1–7; title-page and contents to Vol. 9 (1874–1877); title-page to Vol. 10, (1878–1884); title-page to Vol. 12, (1891–1895).

Scientific Roll, The. London: 1880–1883, all beyond No. 11.

Seine Inférieure, Bulletin de la Société centrale d'Horticulture du Département de la. (*Formerly* Société d'Horticulture de Rouen). Tome 5 (1853–1856), cahier 4; Tome 7 (1860), cahier 1; Tome 14 (1870–1872), cahiers 2 of 1872; title-pages to Vols. 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13 and 14; tables of Contents to Vols 6 and 7. [Also] Tome 1 de la Pomologie, cahiers 2, 3 (being respectively cahiers 3 and 6 of Vol. 2 of Bul. Soc. cent. d'Hort.) and 6; Tome 2, cahiers 3 and 4, and title-page and table of contents.

Semi-Tropic California. Vols. 1 and 2, 1878 and 1879 and January, 1881, and March, 1882.

Smithsonian Institution. Annual Reports of the Board of Regents. 1st (1846), 2d (1847), 3d (1848), 5th (1850), 6th (1851), 7th (1852.)

Sociedad Rural Argentina. Anales de la. Vols. 1–15.

Southern Florist and Gardener. Nos. 6 and 12 of Vol. 1 and Nos. 5 and 6 of Vol. 2.

Sowerby's English Botany, Supplement to the 1st edition; Vol. 5, including plates 2961–2995.

Sweet, Robert. Geraniaceæ. Vol. 5.

United States Consular Reports. Index to Nos. 112–151 (inclusive).

United States Department of Agriculture. OFFICE OF THE SECRETARY OF AGRICULTURE. *Reports of Commissioner of Patents.* 1841, 1843.

Monthly Reports: 1863.—September (41 pp.) and October (20 pp.) Title-pages and indexes for 1863–4, 1865, 1866, 1867 and 1868.

Special Reports: Old Series. No. 34, on Contagious Diseases of Domesticated Animals. 391 pp. 1881.

Special Reports, unnumbered: The Department of Agriculture; Its History and Objects. By J. M. Swank. 64 pp. 1872.—Annual Report supplemental of the Commissioner of Agriculture to the President, Nov. 1877; also transmitting supplemental departmental reports 1 and 3. 1877.—Report on the Participation of the Department of Agriculture in the International Exhibition of 1876, at Philadelphia. By William Saunders. pp. 223–434. 1884.—Rules and Regulations of the United States Department of Agriculture for the suppression and extirpation of all contagious, infectious, and communicable diseases among the domestic animals of the United States, prepared by the Commissioner of Agriculture [N. J. Colman]. 7 pp. 1887.—Notice of Department of Agriculture; of its various functions. Folio sheet.—Koebele, A. Studies of parasitic and predaceous insects in New Zealand, Australia, and adjacent islands. June, 1893. 39 pp.

BUREAU OF ANIMAL INDUSTRY.—Circulars 9 and 14.

DIVISION OF BIOLOGICAL SURVEY.—All circulars later than 17.

DIVISION OF CHEMISTRY.—Bulletins 41 and 42.

DIVISION OF ENTOMOLOGY.—Circulars of 1st series, except No. 9. Circular No. 1, (2nd series).

OFFICE OF EXPERIMENT STATIONS.—Circulars 1–11, 13–17, 19–22, 26 and 29.

DIVISION OF FORESTRY.— Annual Report of the Chief for 1894.
Circulars 1, 2, 4, 6, 7.
Letter from the agent of the Forestry Division, requesting information as to the extent of the lumber and wood trade. July, 1883. Folio sheet.
Circular issued for information of railroad managers. 1887. 4 pp., large 8vo.
Statement of B. E. Fernow, Chief of Forestry Division, to the Committee on Agriculture, House of Representatives, Feb. 16, 1895. 4 pp.
Instructions for the collection of test pieces of pines for timber investigations. n. d. 4 pp.

DIVISION OF MICROSCOPY.— Special report: Naphthaline as an insecticide, etc., its effect on seeds, plants, and animals. 1883. 6 pp.

DIVISION OF ORNITHOLOGY AND MAMMALOGY.— Circulars 1–16. North American Fauna, Nos. 6, 7, and 9.

OFFICE OF ROAD INQUIRY.— Circulars 1–12 inclusive.

SILK SECTION.— Bulletin No. 1. How to raise silk worms. 16 pp., x figs. February, 1890.

DIVISION OF STATISTICS.— The arid lands. 7 pp. September, 1889.

DIVISION OF VEGETABLE PHYSIOLOGY AND PATHOLOGY.— Circulars 1, 2, 3, 13, and 14.

WEATHER BUREAU.— Report of the Chief of the Weather Bureau, 1895–96. 4to. pp. 266.
Bulletin 11, Part III; Bulletin 15, Protection from Lightning, by A. McAdie. June, 1885. 26 pp. xiii figs.
Monthly Weather Review. Vols. I–XIX and Vol. XX, Nos. 2, 5, and 6.

United States Department of State. Consular Report on The Licorice Plant, 1885.

United States War Department. Signal Service Notes. No. XXI, and all later than No. XXIII.

Victoria Department of Agriculture. Guides to Growers. Nos. 1–7.

Virginia Commissioner of Agriculture, First Annual Report.

West Chicago Park Commissioners' Reports. 1st to 5th, 8th to 17th, 19th to 22nd, and 24th.

Western New York Horticultural Society. Reports 1 to 18, 36 and 37.

West Virginia State Board of Agriculture. 1st Biennial Report, for 1891–92.

Wilson Quarterly. Official Organ of the Wilson Ornithological Chapter of the Agassiz Association. Vols. I–III, and Vol. IV, Nos. 3 and 4.

Also Bulletin No. 6 (1895?) of the Wilson Ornithological Chapter of the Agassiz Association.

Wisconsin Agricultural Society. Transactions:—Vol. 1, 1851; Vol. 4, 1854–7(?); Vol. 6, 1860; Vols. 16–20, 1877–8 to 1881–2; Vols. 24–26, 1885–6 to 1887–8.

Wisconsin Horticultural Society. Reports previous to 1864; 1869, 1870; Volume 9, between 1878 and 1879–80; Vol. 16, 1886; Vol. 21, 1892.

Worcester North Agricultural Society. Transactions. 1st to 4th (1853–'56), and for 1863, '66, '67, '69, '70, '72–'78, '80–'82, and '90.

Zuccarini, J. G. Plantarum novarum . . . . horto botanico . . . Monacensi. Fasciculus 2.

DUPLICATE BOOKS FOR SALE.

The Massachusetts Horticultural Society has for sale many duplicate books, among which are:

Alphand, A. Les Promenades de Paris. Vol. I, text, and Vol. II, plates, large paper (25×17½ inches) copy. Paris: 1867–1873.

Country Gentleman. Vols. 1–32, large 4to. Albany, N. Y.: 1853–1868.

American Agriculturist. Vols. 1–10, 8vo. New York: 1842–1851; and Vols. 16–53, large 4to. 1857–1894.

Horticulturist. Vols. 9–17, imp. 8vo., edition with colored plates. Rochester and New York: 1854–1862.

Aublet, M. Fusée. Histoire des Plantes de la Guiane Françoise. 4 vols., 4to. Paris: 1775.

Edwards's Botanical Register, New Series. Edited by John Lindley. Vols. 1–10, large 8vo. 750 colored plates. London: 1838–1847.

Persons desiring any of the above will please address "Librarian Massachusetts Horticultural Society, No. 101 Tremont St., Boston."

CONTENTS.

	PAGE
GENERAL HORTICULTURE,	353, 354
Horticultural Journals,	354
Horticultural Societies,	354–356
FLOWERS AND ORNAMENTAL PLANTS,	357–359
Floricultural Societies,	359, 360
FRUITS,	360
Fruit Growers' Societies,	360, 361
VEGETABLES,	361
GREENHOUSES, ETC.,	361
PARKS,	361, 362
CEMETERIES,	363
TREES,	363
FORESTRY,	364
Forestry Journals,	364
Forestry Associations, Etc.,	364, 365
GENERAL AGRICULTURE,	365, 366
TROPICAL AGRICULTURE,	366
GRASSES AND FORAGE PLANTS,	366
AGRICULTURAL CHEMISTRY,	366, 367
SOILS, FERTILIZERS, ETC.,	368
Agricultural Journals,	368
Agricultural Societies, Boards, Etc.,	368–390
Agricultural Experiment Stations, Etc.,	390–393
NOXIOUS PLANTS,	393
INSECTS,	393, 394
PLANT DISEASES, ETC.,	394
SPRAYING,	394
GENERAL BOTANY,	394, 395
ECONOMIC BOTANY,	395, 396
MEDICAL BOTANY,	396
TERRITORIAL BOTANY,	396-398
PHYSIOLOGICAL BOTANY,	398
CRYPTOGAMIC BOTANY,	399, 400
BOTANICAL MONOGRAPHS,	400
Botanical Journals,	400
Botanical Societies,	401
Botanical Gardens,	401–403
NATURAL HISTORY SOCIETIES, ETC.,	403–405
MISCELLANEOUS,	406, 407
PERIODICALS PURCHASED,	407, 408
PERIODICALS RECEIVED IN EXCHANGE,	408, 409
LIST OF BOOKS WANTED BY THE SOCIETY,	411–418
DUPLICATE BOOKS FOR SALE,	419

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1897.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1898.

The following papers have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the "Boston Transcript." As here presented, the papers are printed in full, and the discussions, where it appeared necessary, have been carefully revised by the speakers.

The Committee on Lectures and Publication take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature, in the papers and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

J. D. W. French,
B. M. Watson,
N. T. Kidder,
} *Committee on Lectures and Publication.*

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 2, 1897.

A stated meeting of the Society was holden today at eleven o'clock, the President in the chair.

This being the commencement of the term of office of the new board of officers and Standing Committees, the President, FRANCIS H. APPLETON, delivered the usual annual address, as follows:

ADDRESS OF PRESIDENT APPLETON.

Fellow-members of the Massachusetts Horticultural Society:

We find ourselves in the same location and within the same building at the commencement of a new year, during which I shall continue, through your votes, to have the honor and responsibility of presiding for a second term, and of endeavoring to do my part, under our constitution, to perform the duties of the office.

One year ago today I said to you, in part, that its founders did not suppose "that this Society would exist to see the day when it had outgrown the arrangements which were made for it by their successors, upon this site, only thirty (now thirty-one) years ago." I now repeat that statement, as applicable today as then.

Your chosen officials have had this subject under consideration during the past year, and are still unable to present any recommendation, with a view to improving our home, for your favorable consideration. In this I believe your Committee to be unanimous.

In the city of Philadelphia there has been dedicated and opened, during the past year, a new fire-proof building for the Pennsylvania Horticultural Society, designed to promote the work in which we, of this Massachusetts Society, are all interested.

The land upon which the Pennsylvania Society has built was owned by William L. Shaffer, thirty-four years a member and seventeen years president, who, at his death in August, 1884, left his entire estate to his sister, who, in May, 1887, by deed of trust, placed the land and a building which had previously been used by the Horticultural Society in the hands of trustees and their successors, to hold forever for the benefit of the Pennsylvania Horticultural Society. In May, 1893, the hall was a second time destroyed by fire.

In the autumn of 1894, on approval of the Society, it was leased for thirty years by the said trustees to five gentlemen, who, as trustees for the bondholders, secured an issue of income bonds, bearing interest at three per cent, $200,000, with which, together with $25,000 insurance money, the new building has been built.

The uses to which that new building can be put seem to me to be uses for which a horticultural building can well be erected in this growing city of Boston, and meet a long-felt want; which, at the same time, would be of a plan best calculated to advance and promote the direct objects for which this Society was incorporated, *i.e.*, "for encouraging and improving the science and practice of horticulture."

In considering the future of our Society, it seems to me advisable to give prominence to our own needs by stating how similar needs have been met by our allies in Pennsylvania.

The Horticultural Building at Philadelphia is located centrally upon a lot of land two hundred by ninety feet, so situated that it is easy of access by carriage or street car. Some of its entrances are under cover, and all are well planned. Its offices, reception and ante-rooms are commodious, and will accommodate at least one thousand people. These, with a lecture hall and grand staircase hall, are on the first story. From the grand staircase one enters the large hall, seventy by one hundred feet, which has a vaulted ceiling at a height of thirty-five feet. This latter room will seat eleven hundred persons for concerts and lectures, and five hundred for banquets, and is admirably suited for large assemblies.

All these uses promote a market for horticultural products, and encourage advanced taste of both palate and mind, which helps to promote the Society's chartered object.

The halls are well lighted from outside by day and by electricity at night, and are well ventilated. I have said that the building is rated as fire-proof.

At the west end of the large hall is a platform, below which, and upon a level higher than that of the first floor, are six small rooms. In the front part, and on the same level with the large hall, is a suite of rooms consisting of a small hall and two supper rooms, where suppers can be served when entertainments are in progress in the large hall, or all can be used in connection with the large hall. Serving-rooms are in the front part of this floor under a convenient balcony, which, by elevators, connect all of this floor with the kitchens, pantries, and china closets on the third floor.

While all that is thus described can add to the income and promote horticultural aims, the opening into one extensive promenade of all the space on the second floor, by a system of sliding partitions or folding doors, makes a superb opportunity to display plants, flowers, fruits, vegetables, etc., in a most complete way.

An elevator, the floor of which can form a section of the floor of the large hall, delivers plants of any reasonable height, and all other exhibits, conveniently. Rubber-tired cars can be used to bear them to any part of the first or second stories.

A basement that is largely above ground affords ample accommodation for floral and other horticultural business, and also for the Society's storage, dynamos, boilers, etc.

The Pennsylvania Society's Library appeared to be smaller than ours, but a new building, whether on this site or some other, or our present building remodelled, can always be planned to meet the needs in this direction.

Whatever may be done in the future to improve our home facilities, may we be able to secure as useful a home for our chartered purpose as has the society to which I have been calling your attention secured to promote Pennsylvania horticultural interests.

Are we now, by the liberal expenditure for prizes, advancing the science and business of horticulture as much as in our power? is a subject that we should all take into serious consideration.

To carry on our work we must have income, and the larger our income the greater must be our success on the lines for which we are incorporated; and, provided we apply it most wisely and conservatively, it will continue to us in increasing quantity.

It would not, in my opinion, be lessening our benevolent work, but rather increasing it, to charge a reasonable fee to non-members visiting our exhibitions, subject to a judicious issue of the usual complimentary passes.

Our Society should be benevolent to the public by allowing the non-members to contribute toward the good that the Society aims to do for the public and horticulture in general.

If our exhibitions are to increase in horticultural profit to those who view them, and the prizes are to continue in their present or increased liberality to those who win them, the non-member beneficiaries can, and in reason will, be ready to contribute toward the success and perpetuation of our work.

Our Library is valuable, and appeals to lovers of horticulture to make greater use of the books upon its shelves. Considerable work is done and money spent, annually, to keep it in an advanced condition, and we hope that all possible good to the State shall come from its being well used. To make its value known is one way to increase its usefulness.

The lectures given during the past season by the Society were generally of much value, and their usefulness was promoted as much as was possible by the help from lantern-slide pictures.

We were fortunate in having with us, as lecturers during the season of 1897, officers of the Department of Agriculture at Washington, and professors from universities and colleges, as well as men of practical experience, and we can congratulate the Committee and ourselves upon the result.

The small attendance at our adjourned meetings would seem to indicate either a decreasing interest in our work, or that our members believed that our business meetings were too frequent. I have been led to examine our constitution to see by what authority our monthly business meetings are held. I find only four stated meetings required by our constitution, *i.e.*, the first Saturdays in January, April, July, and October, with provision for calling other meetings when deemed necessary.

The Executive Committee are to meet monthly, and to report

on the first Saturday of each month, with the names of such persons as they recommend for election. Judging by the present custom in clubs and associations, it is a fair interpretation of this last provision that such names are to be either kept on file, or posted in the building by the Secretary until the next stated meeting, when they shall be voted upon by the Society.

I believe that it may increase the interest in the Society to follow the plan which is thus suggested by our constitution, rather than to adjourn our stated meetings with very little occasion, as has been simply a custom. I believe this will be returning to a former custom.

During the past year the Society has lost by death 33 life members, and gained 24; and has lost by death 13 annual members, and by commutation to life membership 1; while 5 annual members have resigned, making a loss of 19 annual members, with a gain of 18.

The use of the library appears to have decreased, and I suggest that if the Committee on the Library shall make a rule limiting the time during which books can be kept from the library room, such a rule might help develop the usefulness of the library. The value of the library should become better known to the students of horticulture, and it is hoped that such may result.

I commend to your careful consideration the several reports of your Standing Committees, from which you will gain information as to those departments, and learn of the suggestions therein made for the good of the Society.

Those reports will be printed in the Transactions, which I hope will be issued soon, in order that their usefulness to you may thus be the greater. With the intelligence that can be found in our printing offices today, those can be found who will assume the responsibility of technical work, and thus expedite to our benefit in this case, for example, what might otherwise cause much delay under old-fashioned methods.

The interest in the mushroom, a most nourishing food when the edible species are known to the gardener, has grown largely within the past few years, and a more general knowledge among our people of what are the edible species, and what are their characteristics, is desirable.

I have asked Mr. Hollis Webster, an expert, to give me a few points to incorporate into my address, but as he has so well

expressed the views of the mushroom lover in a letter to me, I shall present it as being what I would call to your attention.

Hoping that this new year may bring profit and happiness in all due quantity to our members, and expressing my appreciation of the honor of again serving you in this chair, we will now continue the usual order of business.

The appropriations previously recommended by the Executive Committee for the year 1897 came up for final action, and were unanimously voted, as follows:

For Prizes and Gratuities:

For Plants	$2,000
For Flowers	2,600
For Fruits	1,800
For Vegetables	1,200
For Gardens	500
Total for Prizes and Gratuities for the year 1897,	$8,100

These amounts are the same as last year, except that for Vegetables, to which $50 is added.

The following appropriations were also recommended, all being the same as last year:

For the Committee on Lectures and Publication, this sum to include the income of $50 from the John Lewis Russell Fund	$300
For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee	400
For the Library Committee for the purchase of magazines and newspapers, binding of books, and incidental expenses of said Committee	400
For the Committee on School Gardens and Children's Herbariums, this sum to cover all incidental expenses of said Committee, and to be paid through the usual channels	250

The Executive Committee further recommended that the sum of $38 be transferred to the Flower Committee from the unexpended balance of the appropriation for the Fruit Committee, to cover the deficit in the awards made by the Flower Committee in 1896, the same not to establish a precedent.

The Executive Committee also reported that they had procured

an act in addition to the act incorporating the Society, empowering it to hold real and personal estate to an amount not exceeding one million dollars.

The Executive Committee reported the appointment of Charles E. Richardson as Treasurer and Superintendent of the Building, and recommended to the Society to appropriate $1,500 for his salary. The Committee also reported the appointment of Robert Manning as Secretary and Librarian, and recommended the appropriation of $1,500 for his salary.

These reports were unanimously accepted, and the recommendations therein adopted, and the appropriations recommended were voted.

John G. Barker, Chairman of a Committee to prepare a memorial of the late Samuel G. Damon, reported as follows:

The Committee appointed to prepare a memorial of our late associate, Mr. Samuel G. Damon, respectfully report that they have attended to their duty, and present the following preamble and resolutions:

Whereas, It has pleased our Heavenly Father in his wise providence to remove from our number Mr. Samuel G. Damon, we desire to place on record our appreciation of his worth and labors.

Mr. Damon had been a member of this Society for thirty years, and during that time was a constant contributor to the exhibitions. Fruit was his specialty, and he excelled as a cultivator of hardy grapes and pears, and carried off many first prizes as evidence of his skill in this department of horticulture.

In all the walks of life he was an upright and honorable man, and a perfect gentleman, and while we miss his presence among us his memory and influence still live. Therefore be it

Resolved, That we deeply mourn the loss of this most worthy member, and sympathize with his family in the still greater loss they have sustained.

Resolved, That this preamble and resolutions be spread upon the records, and that a copy be sent to the family of the deceased.

JOHN G. BARKER,
E. W. WOOD,
C. F. CURTIS,
} *Committee.*

The memorial was unanimously adopted.

E. W. Wood was granted further time to prepare his report as Delegate to the State Board of Agriculture.

On motion of Ex-President William C. Strong, a vote of thanks to the President for his annual address was unanimously passed, the question being put by the Secretary. The President expressed his pleasure at the appreciation by the Society of his efforts to serve it.

E. W. Wood, Chairman of the Committee on Fruits, read documents looking to legislation for the prevention of the disease of the peach known as "yellows." A motion that the Society take part in the effort to secure such legislation was negatived, after discussion by several members.

The President read a letter from the Executive Committee of the Boston Mycological Club, thanking the Society for the hospitality extended to the Club, and expressing their high appreciation of its value; without it they would hardly have been so successful as they were in extending so widely the knowledge of this branch of the Society's work.

JOHN MUTCH, of Brookline, and
HENRY S. ADAMS, of Dorchester,

having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected.

The President announced that the first of the series of weekly lectures for the present season would be given on the next Saturday, by Professor George L. Goodale, of Harvard University; subject, "Tropical Horticulture," with stereopticon illustrations of the principal Economic Plants of Hot Climates, and that the lectures would be free to all.

The meeting was then dissolved.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 9, 1897.

A meeting for Lecture and Discussion was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair. The lecture was on

Tropical Horticulture, with Illustrations of the Principal Economic Plants of Hot Climates.

By George Lincoln Goodale, Professor of Botany in Harvard University, Cambridge.

Tropical horticulture is likely to attract more and more attention at the hands of our younger and more enterprising students of the subject of botany as increased facilities are afforded for gaining an acquaintance with the capabilities of the tropics. And with this increase of opportunity there will probably come increased interest on the part of investors and business men in different lines of commerce depending on the products of tropical agriculture and horticulture. As some now present are aware, considerable increase of interest in this matter has already been manifested in this vicinity, and already a good amount of capital has gone forward in lucrative undertakings of this nature.

Therefore it will not be out of place in a meeting in this hall, devoted to the advancement of horticulture in general, to present some of the phases of this subject and call attention to some of the requisite cautions which possibly may be forgotten. It must be remembered that the subject should be most carefully examined by all those who intend to engage in tropical pursuits, and the numerous works of a practical character on the subject leave little excuse for such persons to be ignorant in regard to conditions which will confront them in the tropics. Referring, then, all inquirers who have in mind undertaking tropical horticulture to the treatises of a practical character, many of which can be seen in the excellent library of the Massachusetts Horticultural Society, I shall pass at once to a brief consideration of a few salient points of some general interest, and illustrate the subject by numerous photographs of tropical vegetation.

Our cursory survey will be confined to the moist tropics, and will not touch the interesting matter of the deserts, reclaimable and irreclaimable. The tropical climate which we are to look at is best exemplified in the equatorial belt. The climatic conditions of this zone have been most graphically described by Belt, Bates, Charles Kingsley, and Alfred Russell Wallace, whose works are absorbingly interesting from every point of view.

From the works of one of these authors I shall cite a description of a tropical day. And as you examine the peculiarities of an equatorial day, you will remember that near the Tropic of Cancer and the Tropic of Capricorn the climate is by no means as equable as that near the Equator. Wide ranges in temperature and rain may come in with the changing seasons, and annual vegetation may go down even to the verge of extinction, as is now the deplorable case in parts of the south and middle of India. Bearing this in mind, we may consider the equatorial day. I quote from Mr. Bates, the naturalist in Nicaragua. He begins with the morning, in which there is no twilight. Day is not ushered in by dawn as with us.

"At that early period of the day [the first two hours after sunrise] the sky was invariably cloudless, the thermometer marking seventy-two degrees or seventy-three degrees Fahrenheit; the heavy dew of the previous night's rain, which lay on the moist foliage, becoming quickly dissipated by the glowing sun, which, rising straight out of the east, mounted rapidly toward the zenith. All nature was fresh, new leaf and flower-buds expanding rapidly. . . . The heat increased hourly, and towards two o'clock reached ninety-two degrees to ninety-three degrees Fahrenheit, by which time every voice of bird and mammal was hushed. The leaves, which were so moist and fresh in early morning, now became lax and drooping, and flowers shed their petals. On most days in June and July a heavy shower would fall sometime in the afternoon, producing a most welcome coolness. The approach of the rain-clouds was after a uniform fashion very interesting to observe. First, the cool sea-breeze which had commenced to blow about ten o'clock, and which had increased in force with the increasing power of the sun, would flag and finally die away. The heat and electric tension of the atmosphere would then become almost insupportable. Languor and uneasiness would seize on everyone, even the denizens of the forest betraying it by their motions. White clouds would appear in the east and gather into cumuli, with an increasing blackness along their lower portions. The whole eastern horizon would become almost suddenly black, and this would spread upwards, the sun at length becoming obscured. Then the rush of a mighty wind is heard through the forest, swaying the tree-tops; a vivid flash of lightning bursts forth, then a crash of

thunder, and down streams the deluging rain. Such storms soon cease, leaving bluish-black, motionless clouds in the sky until night. Meantime all nature is refreshed; but heaps of flower-petals and fallen leaves are seen under the trees. Towards evening life revives again, and the ringing uproar is resumed from bush and tree. The following morning the sun again rises in a cloudless sky; and so the cycle is completed; spring, summer, and autumn, as it were, in one tropical day. The days are more or less like this throughout the year. A little difference exists between the dry and wet seasons; but generally the dry season, which lasts from July to December, is varied with showers, and the wet, from January to June, with sunny days. It results from this, that the periodical phenomena of plants and animals do not take place at about the same time in all species, or in the individuals of any given species, as they do in temperate countries."

It is under conditions like these that the tropical cultivator has to live and carry on his work. The enervating influence of the climate upon a resident of the cooler zones is very marked, but with proper precautions as to living according to the stern rules of hygiene, life can be made very safe.

[At this point Professor Goodale introduced on the screen many stereopticon views of the dominant vegetation of the tropical climates, both north and south of the equator. The description of these views obviously cannot be given in this report.

The lecturer then proceeded to the consideration of some of the more important food plants of the tropics and sub-tropics, and their cultivation.]

Tropical cultivation of food plants is interesting from the ethnological standpoint. In warm climates where men can easily procure enough food to sustain life there is little incentive to exertion. If a small group of cocoanut palms and a few banana plants yield all the food one wants, why should any pains be taken, for instance, to raise rice? However, the natives of hot, moist climates do attend to the cultivation of a few food plants, one of the reasons being that they wish to vary the monotony of diet.

Many tropical products reach the markets of the world directly from the wild plants, but many of these plants are coming more and more under cultivation. The cultivation is, as can easily be understood, largely under the stimulating influence of

foreigners in these hot climates. Their enterprise, such as it is, lies at the basis of nearly all such cultivation of tropical crops.

Among the more commonly cultivated tropical products are spices, a few palms, textile plants, sugar-cane, certain varieties of tobacco, a few coloring matters, and many food plants. A few of these plants are now to be reviewed, and we may begin with the food plants.

Rice. — As raised in Ceylon, the land in which rice is to be planted is laid out so as to be saturated with water as required. The soil, being covered with a few inches of water, is stirred up by implements, or by driving bullocks hither and thither over it. In this loosened soil the seeds are placed and the quickly grown plants, with their tender green shoots, soon give the field a beautiful appearance. By and by the nodding heads show that the grain is growing heavy, but the vigilance of the cultivator does not relax. The ground is frequently saturated and search is made for the enemies of the plant. When the harvest comes the laborers secure the crop mostly by hand, as the grains are so easily detached that great care must be taken to grasp each cluster firmly before it is cut off. The rice is then husked and the dark brown grains become the beautiful white ones we know so well. In the Botanical Museum at Cambridge these processes are illustrated by photographs and the products are shown in all stages. Near by is another collection which at this time possesses great pathos — that of the famine-grains of India. Only the well-to-do can use rice, and cheaper grains are the food of the poor. But this year these have failed and a terrible famine is approaching parts of middle India, and before many months have gone, thousands will have died of starvation. The reason for this is that these people live just north of the equable equatorial belt, where the climatic conditions are unfavorable.

Coffee. — The coffee of commerce is raised within the tropics. Given by Arabia to the Malayan Archipelago and to parts of India and Ceylon, it has generally flourished. In Ceylon, however, it has had an almost fatal check from a destructive fungus and an equally destructive insect. The coffee plant at a distance sometimes resembles one of our Viburnums, but often takes the shape of a tree. Approaching, one sees the glossy dark-green

leaves, white flowers, and forming fruit. The trees, which are placed far enough apart to give room for gathering the ripe berries, require little care beyond keeping the ground clear at their base and removing any scale or other insects. When ripe the berries are gathered and "pulped." The seeds are generally two, with flat faces which come together. Sometimes only one seed ripens, and becomes round. It is then called "pea-berry" or "male-berry." These seeds are next separated from a parchment-like membrane which clings to the interior cleft, and after drying are ready for shipment.

Tea. — The different varieties of the tea plant are probably all referable to two species of Camellia. In hot climates like Ceylon it is possible to get an excellent product at less risk of injury, and cheaper, as to mere raising, than in China or Japan. But it is subsequent treatment which largely controls the price. The plants must be good, to start with, and must have good soil. When ready for the first picking the laborers snip off with thumb and finger the tips of the branches. When the bush is thus stripped it is ready to have the axillary buds start out and give new growths of fresh tips, and so on, a new picking being possible as often as the shoot is ready. The picked tips are brought to the factory and dried, and prepared to constitute green tea. Nowadays it is more common to let the leaves wilt a little, and undergo a process of change which is improperly but very generally called "fermentation," by which they become much blackened. They are then rolled by ingenious machinery and carefully dried. This is a very brief account of the usual process now adopted in Ceylon and parts of India for the preparation of certain forms of black tea. In Ceylon and India it is possible to have a good many "flushes" of fresh shoots and tender leaves during the year, whereas in more northern regions the number of pickings is much less. Obviously the most costly factor in the production of tea is the labor in picking it. This renders it practically impossible to cultivate tea profitably under existing labor conditions in our own South.

At the present time tea is seldom adulterated. The very cheap teas in the market are chiefly those which have been injured by keeping, or have suffered in some way during manufacture or transportation. Besides them, there are good cheap teas which are simply from coarser leaves.

Cacao. — Chocolate plants, as we shall now for convenience denominate the Cacao trees from which chocolate is prepared, were originally carried from America to the Old World. They are now cultivated in many parts of the eastern tropical belt, as well as in Central and South America and the West Indian Islands. The plant demands rich soil and a good deal of shelter. One of the most interesting features of this plant is the coming out of the blossoms and fruit on the older parts of the stems. After the fruits are gathered they are opened and their almond-like seeds are spread out for the removal of a part of the pulp. They then undergo a kind of heating process, popularly and not very improperly called "fermentation." The seeds freed from the still clinging, but now rather dry pulp are ready for shipment.

[The cultivation of the banana and its allies and the treatment of palms for the best yield of fruits were next considered at much length, after which the subject of spices came up. The lecturer then spoke of the life of the tropical horticulturist, noting his fondness for plants strange to his own surroundings. He enumerated the principal annoying weeds of the tropics, especially Mimosa and the tuberous species of Oxalis.]

Ginger, Annotto, Curcuma, and a few other species were studied by me in a plantation where Cacao was being successfully cultivated. The work requires a large margin of capital, energy, patience, and health. The tropical cultivator, especially he who has large interests, is subjected to a heavy strain in such a climate. There are perils from invasions of insects and fungi to be guarded against. There are constant improvements in varieties, eagerly seized by competitors, and these must be met. The delights, however, are many, and are attractive to certain temperaments. Nature is at its best in the tropics; life is full to the brim. Though there is not the keen zest in sports and study which is gained from the crisp air of a colder climate, still one can retreat to the hills to gather fresh strength for a new lease of life in the plains. For the children of the English-speaking planter such retreat is absolutely necessary, at short intervals.

If now, in brief résumé, we reduce this complicated question to its lowest terms, we see that tropical horticulture has this remarkable peculiarity: it is conducted under conditions wholly favorable to the life of plants. But just here lies the peril. What is good for one plant is, generally speaking, good for another, and

hence the cultivated plants thrive luxuriantly, but so do weeds and foes. This is illustrated in a striking manner by the growth of Coffee in Ceylon. Everything favored the Coffee plant. Nature was in every way most propitious, but the conditions were favorable also to destructive fungi, and these began their disheartening work. The most destructive of these, here and there assisted, as I have already said, by a destructive insect, ravaged the plantations so completely that the excellent Ceylon Coffee became almost lost to commerce.

It is therefore warfare of a most unrelenting kind which man must wage against the foes of cultivated plants in the tropics. He must at every point aid his protégés which have been rendered almost completely helpless by long-continued assistance from man. When the hand or aid of man is withdrawn, the cultivated plant either falls an easy prey to its foes or it relapses into a sort of quasi-defence, which often suggests the wild condition from which it sprang.

While, therefore, there is very much to encourage the novice in tropical horticulture there is very much that is preëminently discouraging. Tropical horticulture is far from being a sinecure. It demands earnest study of the conditions of plant life in all its relations, and it requires, also, a knowledge of the difficulty of getting good work done under tropical skies. Under exceptional conditions good work is done by natives, but as a rule they are apathetic and it is hard to secure faithful service. The young man who leaves a northern home for tropical venture must make up his mind to hard work under unfamiliar conditions. With this steadily in mind such ventures, under the precautions referred to, can be reasonably successful.

[The lecture was illustrated throughout by stereopticon views, chiefly of Ceylon, the Straits settlements, Java and the Malayan Archipelago, together with some of the newer plantations in Northern Queensland and Polynesia. Professor Goodale also referred to a Chinese book on the cultivation of Rice, in the Library of the Horticultural Society, with plates giving a vivid idea of the cultivation of that grain in China.]

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 16, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President CHARLES H. B. BRECK in the chair. The following lecture, which was fully illustrated with stereopticon pictures, was delivered:

THE STRUCTURE AND CLASSIFICATION OF MUSHROOMS.

By HOLLIS WEBSTER, Secretary of the Boston Mycological Club, Cambridge.

Whatever may be the cause of the present popular interest in mushrooms, it is evident not only to botanists, but to casual readers of the monthly periodicals and of the daily press, that within a few years this interest has grown largely, and that it is spreading widely. Its manifestations are various and unmistakable; but most of them have taken the form of demands for information and of the responses of those who have been willing to give it. Three years ago, for instance, there appeared three responses to this demand, one from an artist,[1] whose nature studies have made him popularly known; one from the State Botanist of New York,[2] who has for thirty years given special attention to the subject; and one from the Professor of Cryptogamic Botany at Harvard.[3]

Most of the numerous articles that have recently appeared have been concerned with showing the difference between edible and poisonous kinds of mushrooms (or toadstools, which are the same thing), and have been addressed to the general public. There are, however, many persons who wish to know something about mushrooms as plants, and perhaps to engage in limited studies concerning them. These people generally lack a knowledge of the elementary facts concerning structure and classification that would make easy an attack upon the literature of the subject. To such would-be students of a small part of the field of mycology this lecture is addressed in the hope that it may be of some assistance.

At the outset it will be well to come to an understanding as to the term *mushroom* itself. In every-day language it usually

[1] W. H. Gibson, in "Harper's Monthly Magazine" for August, 1894.
[2] C. H. Peck, in the "Cultivator and Country Gentleman," May 31-Sept. 20, 1894.
[3] W. G. Farlow, in "Garden and Forest," Jan. 24-Feb. 28, 1894.

means the sort of fleshy fungus that is good to eat, and particularly — to some people only — the common pasture kind. A *toadstool*, on the other hand, means something poisonous, or at least to be avoided. As a matter of fact, no distinction can be made between the two terms, though the term toadstool is more comprehensive, for it may be used to include the common pasture mushroom and all other fungi whose form is in general the same. Both terms are also loosely applied to other kinds, even to such forms as Puff-balls and Stink-horns.

If we look at a common mushroom of the pasture or the market, we see that it may be easily divided into two parts, an upright stalk, called the *stipe*, and a flat, expanded portion, the *cap* or *pileus*. Attached to the under side of the cap are membranous plates, the *gills*, or *laminæ*, radiating from the top of the stipe to the edge of the pileus. The upper part of the gills is attached to the lower surface of the cap, and their lower edges, which are usually very thin and rather sharp, hang free. In the mushroom that we are examining there is a space between the crowded inner ends of the gills and the top of the stem. In other kinds of mushrooms we may find the same condition of things, or it may be that the gills reach the stem and are attached to it, or even run down upon it as ridges, which in some cases end abruptly and in others are gradually reduced to mere lines. Upon the gills are borne in countless numbers the spores — exceedingly minute bodies, which, as it is their office to germinate and grow into new mushroom plants, may be roughly compared to seeds. The mushroom, in fact, as we see it, is nothing but a contrivance for the production and dissemination of the spores. The arrangement of the gills gives an enormous spore-bearing surface, whence the spores are carried by the wind or by insects, or drop to the ground below. If the cap of a fully grown mushroom be cut from the stem and laid, gills downward, on paper under a tumbler or other cover to keep draughts away, there will be found on the paper after a few hours — sometimes in a very short time — a layer of spores, making a negative print of the gills. In the common mushroom this print will be of a dark brown — almost a purple brown — the color, it will be noticed, of the gills at maturity, for the gills usually take the color of the spores.

Stem, cap, and gills are characteristic parts of most of the fungi commonly called mushrooms or toadstools. There are

other structures, however, peculiar to certain groups. These are a *volva*, a *ring*, and a *veil*. Of the volva, or sheath, characteristic of the poisonous Amanita, a description will be given presently. The common mushroom does not possess it, but does show us a ring and veil.

If we look at a young specimen that has not been long above ground and is still in its compact, rounded form, called by mushroom-growers a *button*, we shall see no gills on the under side of the cap. Indeed, the mushroom may sometimes grow to nearly its full height before they are visible. The reason is easy to see, for stretching unbroken from the edge of the unexpanded pileus to the stem is a delicate membrane called the veil. As the pileus expands, the veil is torn. Shreds of it, perhaps, cling to the edge of the cap, but most of it remains, encircling the stem and thus forming a ring, — a structure the appearance and size of which vary in the different sorts of mushrooms which possess one.

In the genus Amanita, for instance, there is a conspicuous veil. Moreover if you will look at the base of the stem, you will see something else — something like a membranous bag or sheath, from which the stem emerges. Now, when a young Amanita pushes up from the ground, this sheath or bag, technically the volva, encloses the entire plant. As the cap and stem press upward, the volva is ruptured at the top. In the mature plant its remnants are to be found at the base of the stem and sometimes in scattered scaly fragments on the top of the cap. The volva is not in every case so conspicuous as in the example first shown. In others it is reduced to a ridge running round the swollen base, or even to scales. Since the base of the plant is often below the surface of the ground, and the stem breaks easily, care must be used in gathering specimens if the volva is to be secured intact.

The structures so far spoken of are easily seen, but there is much more to a mushroom than this.

You have been told that a mushroom is simply a contrivance for bearing spores. It is thus comparable to the fruit of a flowering plant, which develops and contains the seeds. Where, then, you will ask, is the vegetative part of the plant, the part that absorbs the nourishment and does all the preparatory work of which the growth of the mushroom itself is the result? In other

words, what sort of a plant develops from a spore and where does it live? If you could follow, as you may under a microscope, the germination of a spore, and the stages of growth which follow, your eyes would give you the answer to the first part of this question. You would see the minute spherical or ellipsoid bodies, when supplied with the requisite moisture, burst and put forth slender colorless threads called *hyphæ*. These in time branch again and again, extending constantly in length to form what is called the *mycelium*, or vegetative part of the plant. When such threads are massed together in strands, forming white lace-work or cottony bunches, they are easily found in the substratum on which the fungus grows — in rotten wood, for instance, or in a heap of leaves, or other decaying vegetable matter. In such places the mycelium spreads over or permeates the substance from which it draws its food supply. For fungi do not elaborate their food from raw materials as do the plants that have green coloring matter, but are dependent upon other vegetable or animal organisms, either living or dead; that is, they are parasites, or saprophytes.

What is known by mushroom-growers as the *spawn* consists of a dried compressed portion of a mushroom bed, generally mixed straw and horse droppings, which is permeated by the mycelium. In this condition, in the form of flakes or bricks, it may be transported, and will keep its vitality for months, active growth being for the time arrested. As a rule, then, when mushroom beds are started, it is the mycelium or spawn which is planted — not the spores. When the proper conditions of warmth and moisture are supplied, growth is resumed, and the threads, lengthening, branching, and anastomosing, very soon spread throughout the bed.

It is plain, then, that the mushroom plant for most of its life is out of sight, and consequently not familiarly known. To this fact are due many erroneous notions about the origin of mushrooms themselves. When the time has come for the plant to produce its fruit, there form at various points in the mycelium small masses of densely branching interwoven threads, which in time enlarge to an appreciable size. Each of these masses is the beginning of a button, or nascent mushroom. An examination of buttons in various stages of growth, by means of thin sections brought into the field of a compound microscope, shows pretty clearly the part played by the hyphæ in the mushroom proper, the

substance of which is made up of the compacted and closely interwoven threads and their branches. Along certain radiating lines is formed the framework of the gills, which in the developed mushroom is called the *trama*. Just below the gills an air space appears, the outer wall of which becomes the so-called veil. Lastly, upon the surface of the gills develops a layer of cells standing side by side like the single threads in the pile of velvet or in the surface of an Oriental rug.

With these cells we have a special concern. Taken together they form the *hymenium*, the spore-producing tissue, which, folded like a fan, is applied to both sides of the gill-plates. A section through a gill shows us this layer. Each one of the club-shaped spore-bearing cells composing it is called a *basidium*. Each basidium bears four spores on minute stalks.

So far we have dealt exclusively with gill-bearing mushrooms, a group to which as a whole is given the name AGARICINI. There are other common kinds in which also basidia and spores are developed on an exposed hymenial surface. The hymenium is disposed in different ways. In one group, a large one, it lines the inside of small tubes which are fastened vertically, with the open mouths downward, in a closely packed mass on the under side of the pileus; this is the group of POLYPOREI. In a third group, the HYDNEI, it covers the surface of spines, teeth, or other protuberances. In a fourth it is smooth, without distinctive feature, evenly spread over one or both sides of the tough, or coriaceous, thin body of the plant; this is the character of the THELEPHOREI. In a fifth group, the CLAVARIEI, the plant is tender, fleshy, erect, and often densely branching, bearing the hymenium on all sides of the tips of the branches. Last are placed the rather shapeless, gelatinous TREMELLINEI, which shrivel when dry, and swell again with moisture; in these the hymenium covers the outer surface. From the similar nature of the hymenium and its exposure in these six groups they are classed together as the HYMENOMYCETES. To this natural class, "vasta Fungorum classis," as it was called by Fries, whose treatment of it still remains the basis of later classifications, belong most of the fungi commonly termed mushrooms or toadstools.[1]

[1] A good systematic account of the class as it appears in Great Britain, a work which in the absence of one specially adapted to this country is exceedingly helpful to a student, is Stevenson's "Hymenomycetes Britannici."

This class, however, does not include all the fleshy fungi, or even all those in which there is a hymenium with spore-bearing basidia. In a second class, much smaller, there is a similar method of fruiting; but the hymenium is not exposed, at least at first. A common puff-ball is the best example. A microscopic examination of the interior of a puff-ball shows that it is composed of a mass of chambers the walls of which are covered with basidia, the similarity of which to those in the class first treated is very plain. The chambers, however, are partly filled with branching threads, together called the *capillitium*. When the puff-ball is ripe and breaks open at the top, it is found that the chamber walls have become disintegrated and that the disconnected threads of the capillitium are left, together with an immense collection of spores, all in a dry state and ready to be caught by the first breath of wind. From the shape of the fruiting mass in the puff-ball and allied forms this class is called the GASTEROMYCETES. Since the class is small, our botanists have been able to describe most of our species, at least those of the Eastern part of the United States; and fairly exhaustive systematic accounts of them are to be found in the papers of Burt, Morgan, and others on the Phalloids or Stink-horns, and of Peck, McBride, Morgan, and others on the Puff-balls.

Fructification by means of spore-bearing basidia unites these two classes, together with others composed of less conspicuous fungi, under a still more comprehensive name, that of BASIDIOMYCETES.

There still remain a few mushrooms not included in the groups spoken of, namely, the *Morels*, *Helvellas*, and *Pezizas*. The first two are stalked, and roughly resemble the familiar Agarics; the last are shallow cups or fleshy expansions. A word as to the form of their fructification must suffice. Examination under a microscope of a bit of the outer or upper surface of one of these plants will reveal structures at first sight much like those in the Basidiomycetes. A mat of crowded slender cylindrical cells is seen covering the surface; none of these cells, however, bear spores on their tips. Instead, some of them — not all — contain spores in their interior. Each is, in fact, a little enclosure, called an *ascus*, and if one that is mature be separated from the rest, it will readily be seen to contain eight — almost invariably eight — spores. At the proper time these escape from the asci,

sometimes suddenly and myriads at once. From the surface of a Peziza, for example, as you look at it, there comes a little puff of smoke as the ejected spores are shot into the air to be blown away in a tiny cloud. Pezizas, Helvellas, and Morels are some of the *Discomycetes*, a class excellently treated for Great Britain by Phillips. Multitudes of fungi besides the Discomycetes have a fructification which consists of asci, and the comprehensive name for all of them is ASCOMYCETES.

Most of the mushrooms gathered by the increasing number of fungus hunters, at least by beginners in the study, belong to that class of Basidiomycetes called Hymenomycetes. Among these an Agaric is at once recognized by its gills; a Boletus or Polyporus by its pores; a Hydnum by its tooth-like projections; a Clavaria by its coral-like appearance; and a Tremella by its gelatinous nature. So far identification is a simple matter; but to go farther and decide upon the species requires close study, accurate observation of details of structure, ability to interpret published descriptions, and most of all experience. Many of you know well enough the difficulties you meet in "running down" a flowering plant in Gray's Manual — difficulties which arise often from incomplete knowledge of the structure of the plant, but sometimes from the lack of sharply defined and conspicuous characters in the species itself. The same difficulties meet you in the determination of mushrooms, aggravated by the lack of a Gray's Manual and not infrequently by incomplete or misleading descriptions in the books available.

The most frequent puzzles in identification are among the Agaricini, or gill-bearing mushrooms, whose numbers enormously exceed those of any others you are likely to collect. Since for the most part they are built on the same general plan, and resemble one another at first sight much more strongly than they differ, the task of separation demands close scrutiny and a practised eye. Every detail of structure must be noted: the shape, surface, color, and markings of the cap; the thickness and character of the flesh; the color, shape, and method of attachment of the gills; the nature of the stem inside and out; the presence or absence of ring, veil, and volva, and the nature of each; and also the color and sometimes the shape and size of the spores. No permanent character, whether gross or minute, must escape the eye.

A brief outline of Fries's classification of the Agarics will indicate how the most prominent of these characters are seized upon for a division into groups and genera. The Agarics proper, in which the hymenium is closely connected with the tissue which supports it, fall readily into five groups according to the color of their spores, which are white, pinkish or salmon-color, rusty-brown or ochraceous, dark or purplish brown, and black. Each of these groups is divided into genera (called subgenera by Fries, who placed all five groups under one genus, *Agaricus*) by differences in gross and minute structure. For example, among the white-spored genera (*Leucospori*) *Amanita* is known by its volva; *Lepiota* by its ring and free[1] gills, *Armillaria* by its ring and adnate[1] gills, *Tricholoma* by practical absence of veil and by sinuate[1] gills, *Clitocybe* by decurrent[1] gills, *Collybia* by the involute margin of the young pileus and by a cartilaginous stem, and so on through the list. With the pink spored Agarics (*Hyporhodii*) we run through the same category of structural differences, *Volvaria* corresponding to Amanita, *Entoloma* to Tricholoma, and so on; and the same thing may be said of the rusty brown spored (*Dermini*), the dark brown spored (*Pratelli*), and the black spored (*Coprinarii*), although in the last three groups by no means all types of structural difference are represented. To avoid possible confusion in nomenclature, it should be said that since the subgenera of Fries's original genus Agaricus have been raised to generic value, the old name *Agaricus* formerly given to each species has been retained only for the species of Fries's subgenus *Psalliota*. Hence what old-fashioned writers call *Agaricus muscarius*, *A. procerus*, *A. equestris*, *A. sinuatus*, etc., are now known, respectively, as *Amanita muscaria*, *Lepiota procera*, *Tricholoma equestre*, and *Entoloma sinuatum*.

Still other genera not included by Fries in the old genus Agaricus are included by Saccardo, and after him by Massee and others, with the genera already mentioned under four groups, divided according to spore color. Among these genera are *Cortinarius*, distinguished by its arachnoid veil; *Coprinus*, which deliquesces to an inky liquid; *Cantharellus*, with gills like swollen veins; *Lactarius*, with milky juice; *Lentinus*, with tough substance and serrate gills; and others.

[1] The significance of these and other terms was made clear by lantern slides.

In concluding I present to you the portrait of the revered Swedish mycologist, Elias Fries, who first introduced logical order into the systematic arrangement of mushrooms. After a life devoted to botany, and principally to mycology, he died in 1878 leaving all subsequent students of his chosen field everlastingly indebted to him. The portrait is taken from the second volume of his classical "Icones," or illustrations of mushrooms, which, together with his earlier work on the edible and poisonous species of Sweden, may be seen in the library of the Massachusetts Horticultural Society.

Hoping that this brief exposition in connection with the figures that you have seen may have cleared the ground a little, I refer you for more detailed information to the many good books upon the subject, and particularly to the mushrooms themselves.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 23, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

THE CHRYSANTHEMUM: ITS PAST, PRESENT, AND FUTURE.

By EDMUND M. WOOD, Natick, Mass.

I have the honor, and most assuredly the pleasure, of addressing you upon a subject dear to us all, if for no other reason than that it is a part and parcel of "the means by which we live." The Chrysanthemum has, not inaptly, been termed "the Queen of the Autumn," and it is certainly, as it well deserves to be, one of (if not altogether) the most popular of autumn flowers, a special reservation being made at all seasons for the incomparable and unexcelled Rose.

A famous Irish poet, William Allingham, thus sings:

> "The rustic family of ox-eyes claim
> A royal cousin clad in purple and gold,
> Pearl, ruby, fleecy colors, such as fold
> The couching sun, and with a lofty name
> Chrysanthemum, — appearing bright and bold
> To startle poor November with a flame

Of sumptuous flowerage, making Summer tame,
And flush with Eastern pomp the dark and cold.
Voyager from Japan and broad Cathay,
The slant-eyed yellow people love thee much:
(All humans love a flower) and know the way
To fix their garden favorite with fine touch
In shapes of art. How joyful we to clutch
Their gifts! — but shall we clasp their hands one day?"

Mr. B. C. Ravenscroft, in his treatise on the Chrysanthemum, published in London in 1894, speaks of the popularity of the flower in England. He says that "from the date of the first Chrysanthemum show held in England in 1830, it has steadily advanced, not only in popularity, but in the size and beauty of the flowers as well, and above all in the number of new varieties constantly being introduced. As a matter of fact, more 'novelties' are now being raised and sent out annually than the entire list would number but a very few years ago. Several years have now elapsed since it was the opinion of many horticulturists (myself among the number) that the Chrysanthemum 'craze' was already on the wane; but the event proved the idea to be altogether erroneous. On the contrary, the flower has since become vastly more popular, and is now cultivated in much larger numbers and to greater perfection than ever." Our own experience here in the United States is but a counterpart of that in the mother country.

Mr. Ravenscroft says further, and very justly, that "the secret of the extraordinary popularity of the Chrysanthemum is probably to be found in its unprecedentedly accommodating character, combined with its great utility, not only for exhibition and ordinary decorative purposes, but for supplying flowers for cutting, etc.; while the fact of its natural season of flowering being the autumn and early winter, when flowers generally are much scarcer than at any other season, is doubtless a strong point in its favor. The culture of the plant, at least to a moderate degree of excellence, is also extremely simple, though this can scarcely be said of the production of blossoms for exhibition of the degree of perfection that is required at the present day; while the season for flowering is a long one, and may be extended to more than half of the year.

"The Chrysanthemum is indeed vigorous, free-rooting, and

floriferous to a quite unusual degree, and is, moreover, easily and rapidly propagated with the simplest appliances.

"Again, it is an almost, if not quite, hardy subject: and though a slight amount of artificial heat is at times necessary or desirable, yet it is quite possible to cultivate even the fine show varieties successfully up to a certain point without the aid of any heating apparatus whatever.

"In form, size, and color the flowers are also extremely varied, and for the most part artistic, lacking entirely the stiffness and formality of the Camellia and several other flowers; in size they vary from the tiny pompone, one inch across, to the huge Japanese blossom, one foot or more in diameter; while the range of coloring is also exceedingly large, and the hues for the most part are very rich and soft, if not exactly brilliant. Without doubt, the introduction, or rather development, of the large-flowered Japanese varieties, with their fantastic and endlessly varied forms, and rich, æsthetic coloring, has done much to popularize the plant. One has only to compare the general appearance of a stand of twelve or twenty-four of even the finest incurved varieties with an equal number of Japanese flowers, to appreciate the great superiority, from a decorative point of view, of the latter; while the plants themselves are, on the whole, of a decidedly more robust and vigorous constitution, and consequently more readily cultivated than the formerly more favored incurves."

One more advantage possessed by the Chrysanthemum is that, unlike the Rose, it evinces very little objection to a smoky atmosphere, and may be cultivated almost as successfully in the heart of a city or large town as in the purer air and under the clearer skies of a country spot. As a proof of this, I deem it only necessary to refer to the remarkable showing of Chrysanthemums found in the Temple Gardens, in the very midst of the smoke and the black fog of London. But to produce this result, intelligence and a thorough knowledge of the gardener's art are a prime necessity.

"As cut flowers Chrysanthemums are unsurpassed, if equalled. The colors are admirably suited for all decorative purposes, while the blossoms not only pack and travel better than those of most other subjects, but they also retain their freshness for a long time when placed in water, often, in a cool and dry atmosphere, for some weeks."

The Chrysanthemum, by which is meant our present race of autumn-flowering hybrids, is descended from two original species only, namely: *C. Indicum* and *C. Sinense*. It is in reality a half-hardy undershrub, for the stems, which towards the end of a single season's growth assume a woody nature, if not exposed to more than a few degrees of frost, retain their vitality, to some extent at least, and, under such conditions, frequently break into fresh growth some distance above the base. But in an inhospitable climate like ours, the stems would be invariably killed back to the ground each winter, and thus become annual merely, while the plant itself assumes the character of a herbaceous perennial. The roots, especially those of the finer, large flowering or "show" kinds, if left in the open ground, would be killed outright during a severe winter, and the more effectually should the soil be damp, heavy, or cold.

Here let me say that a Chrysanthemum with small yellow flowers grew in the Apothecaries' Botanic Garden at Chelsea, in England, in 1764; but the first of the large-flowered varieties was received at the Royal Gardens at Kew, and blossomed in 1764, and it is from this latter that the centennial introduction of the flower into England dates.

The first English seedlings of the Chrysanthemum were raised in 1835; and the first Chrysanthemum exhibition in England was held in 1843 at Norwich, and this was soon followed by the Society at Stoke Newington, now known as the National Chrysanthemum Society.

A new era in the history of this plant opened in England in 1847, by the introduction of the Pompon. In 1843, at the close of the war with China, Mr. Robert Fortune was sent out to that country by the London Horticultural Society to collect rare plants, and one of the curiosities he fell in with was the Chusan Daisy; and this and another small flower from the same source were the parents of the tribe known, from their resemblance to a rosette, as Pompons.

Still later, in 1860–62, Mr. Fortune made more discoveries at the town of Ak-sax-saw in Japan. He describes this town of Ak-sax-saw as the most famous place near Yeddo for the variety and beauty of the Chrysanthemums, some of which were in form and coloring quite distinct from any then known in Europe. "If," he said, "I can succeed in introducing these varieties into

Europe, they may create as great a change among Chrysanthemums as my Chusan Daisy did when she became the parent of the present race of Pompons." They were taken up in England, proved successful, and from them sprang those marvellous flowers which it is the pride of all you gentlemen to present yearly at the notable exhibition of our Massachusetts Horticultural Society.

And speaking of our own exhibition, I am reminded of the fact that in Japan every year a special imperial garden party is given in the palace grounds at Yeddo, in honor of this national flower of Japan; and at this, which may be termed the leading show of the world, some of the plants display not less than from three hundred and seventy-five to four hundred and fifty fully developed blossoms, growing upon a single specimen at a time.

The Chrysanthemum has been known in the United States for quite a number of years, but as to its early history here not much is to be gleaned, while as to its career in other countries we are left completely in the dark, with the exception of France. Mr. Dale, for some time the gardener to the honorable Society of the Middle Temple, in London, says of the Chrysanthemum, that "in the early part of the present century it was one of the most popular flowers of England, and, further, that after a period of comparative neglect it has again been admitted to a place in the list of the florists' flowers" — a circumstance in which I am quite sure that all of us rejoice. Indeed, Mr. Dale was so much impressed with the beauty of these extraordinary flowers that he tells us that from the necessity of his having to produce a display of flowers during the greater part of the month of November, his attention was especially directed to the Chrysanthemum as the only one suitable to his purpose.

The Chrysanthemum derives its name from two Greek words, *chrysos* (gold) and *anthos* (flower), and belongs to the natural order Compositæ, and in the Linnæan classification of plants we find it in the class *Syngenesia* and order *Polygamia Superflua*. Its flowers consist of four varieties, namely, Incurved, Reflexed, Japanese, and Anemone flowered. Incurved flowers approach the nearest to what florists consider as the true standard of perfection. Reflexed flowers, though not so good, are by no means to be held in disdain. The Japanese vary very much both in color and the conformation of the flowers, and are most invaluable for conser-

vatory decoration, remaining longer in bloom, and extending oftimes to "January's front severe."

Among Chrysanthemums the Japanese class stands foremost because of its great size, richness of coloring, and the general effectiveness of its flowers; and it is beyond all question the most popular and useful of all classes. The flowers vary greatly in form, and, with perhaps some few exceptions, the plants are of vigorous growth, with broad foliage, stout stems, and large flowers; and it may be that they are more easily grown than any of the other classes.

The Incurved class produces flowers whose petals are bent inward toward the points, presenting the appearance of a more or less perfect ball or sphere. It was the first distinct class obtained, and although it is very beautiful, the blossoms in the mass are not so thoroughly effective as the Japanese, lacking, as they do, the richness and great variety of the coloring. They are, also, more delicate, and certainly more troublesome to manage, than are the Japanese.

In the Reflexed class the flowers are not as large and showy as in some others, yet they are beautifully formed. The petals are reflexed or curved downwards, and overlap each other with the greatest regularity, and the coloring is very soft, delicate, and rich. The whole class are excellent growers, the plants bushy and branching, and they are most prolific in blossoms. They are splendidly adapted to open-air culture.

Of most of the Pompon class, as you all well know, the flowers in general are insignificant in size, although some, which are known as "Hybrid Pompons," are comparatively large.

The early, or what may be known as the summer-flowering, Chrysanthemums form a somewhat varied, but none the less a most useful class. The blossoms of several of the earliest flowering group are no larger than those of the smallest Pompons, while their growth is but very little more than a foot in height. From these the flowers range in size up to those of Madame Desgrange, William Holmes, etc., which are only slightly smaller than some of the Japanese flowers, and the plants increase up to three feet or four feet in height. As a result of hybridization between the two classes the early-flowering kinds run quite imperceptibly into the Japanese, the connecting links being found in such varieties as Madame Desgrange and its sports; Mlle.

Lacroix, Lady Selborne, P. van Geert, etc. The first named, with its sports, G. Wermiz (primrose) and Mrs. Hawkins (deep gold), form a beautiful and most useful group, admirably adapted alike for indoor decoration and for culture in the open air; and a great future is in store for this most excellent and attractive group.

Having thus briefly, and much to my regret imperfectly, sketched the history and peculiarities of this most charming flower, let us take a glance at the methods of its cultivation.

Mr. Edwin Molyneux, gardener to W. H. Myers, Esq., of Swanmore Park, Bishop's Waltham, England, may be looked upon as an expert in all that appertains to the Chrysanthemum, and he "regards a favorable start as being necessary to a successful finish. The foundation must be thoroughly laid to insure that success which all should strive to attain who engage in the cultivation of this flower." Mr. Molyneux speaks *ex cathedra*, for during a period of six years he won eighty-six prizes, and of these no less than seventy-four were firsts. Moreover, these prizes were won in competition with the best growers of the day at the leading shows in the south of England; and the Swanmore blooms were placed first during four consecutive years in the great cup class at Kingston-on-Thames — a feat unparalleled in the annals of Chrysanthemum showing, and never approached since. Mr. Molyneux deserved to be crowned King of Chrysanthemum growers and exhibitors.

And here allow me to suggest a fact with which no doubt you are all quite familiar, that within a radius of ninety miles of Boston the Chrysanthemum is grown to a perfection nowhere excelled in this or any other country.

The cultivation of the Chrysanthemum for blooms for the market and single specimens for exhibition is attended with much more care and labor than any other branch of the Chrysanthemum raising industry; and the fact remains that the culture of the flower, for exhibition alone, has now been elevated to the dignity of a fine art, or rather to that of an almost exact science, and those who desire to win in the future must do not only all that men who have made the subject a special study of a large part of a lifetime have done in the past, and can do at the present time, but a little more than that, and, if among the possibilities, much better, also.

Growing for exhibitions is a most arduous task — the most

arduous, perhaps, that falls to the lot of the Chrysanthemum raiser, with the single exception of raising new varieties from seed. Exhibiting at the present day is by no means what it has been in the past, and the gaining of prizes has become a really difficult feat. Judging is more minute and more intelligent than it was in bygone days. It is now performed almost exclusively by points, and in order that a sufficient number of these points may be secured, untold minutiæ must be most closely observed, otherwise the cultivator, to use a homely, but yet most applicable phrase, "will not be in it." The only way to succeed in these days is to acquaint one's self thoroughly with the details of cultivation as practised by the best growers, and then by some fortuitous combination of circumstances to discover a way by which a better method, no matter how slight, may be attained. In all cases, however, constant and unremitting attention must be bestowed upon the plants from the time the cuttings have been first inserted, until the flowers have been placed upon exhibition and the prize won.

There is one fact that it is well to bear constantly in mind, and that is, that it is absolutely useless to attempt to grow plants or blooms for exhibition, unless they have your constant attention. To give them an occasional attendance, or even but once a day, is in itself a suicidal act. As eternal vigilance is the price of liberty, so unremitting attention is the price of success, so far as the Chrysanthemum is concerned. It is a plant that possesses a most voracious appetite, and it requires to be fed with as much regularity, and as much care, as a suckling infant. It is dainty in its food, and it is a gourmand as well as a gourmet. It requires plenty to eat and drink, and of the very best the market affords. It must be fed upon the very best soils, manures, etc., and its drink must not be alone "the crystal well," but rich liquids and plenty of them, and withal, like the human system, it must breathe a sufficient supply of fresh, wholesome, and life-giving air. Proper drainage is an essential requisite, in order to insure that the plants, as is sometimes said of an unfortunate ship, shall not become "water-logged." Cleanliness is next to godliness in the plant, as well as in the man, and therefore the intelligent grower will see to it that his plants have a clean habitation. Never use a dirty pot. The pots, or the long boxes in which the plants may be raised, should be perfectly clean. Now

this, on the surface, appears to be a trivial matter, but in reality much depends upon it. Test it, and you will find that in turning plants out of pots that were dirty when used, the roots cling so tenaciously to the sides that many are broken in the act of removing them. This does not occur if the pots are clean, but the plants may be shifted with their roots intact, and will not undergo the slightest check from the operation.

In the cultivation of the Chrysanthemum do not attempt too many varieties:

> **"The friends thou hast, and their adoption tried,**
> **Grapple them to thy soul with hooks of steel;**
> **But do not dull thy palm with entertainment**
> **Of each new-hatch'd, unfledg'd comrade."**

An eminent English authority said on this matter of novelties, "I venture to say that quite three parts of the new sorts sent out in such glowing terms are not equal in merit to many of the older varieties. No little disappointment has been caused by purchasing all the new varieties, which were expected to produce wonderful flowers. Instead of this it has often been found that time and space have not been well occupied in growing them. Far better is it to grow an extra number of plants of those varieties which experience has proved can be depended upon as certain producers of first-class flowers under first-class culture, than for a grower with limited experience, money, and space to overburden himself with so-called 'novelties.'"

Every grower of the Chrysanthemum is well aware that it has a tendency to "sport;" that is, a plant that has always yielded flowers of a certain color produces others of a different hue — yellow, for instance, giving out bronze or orange. There are instances when the whole of a plant will thus throw different colored blossoms, but as a rule they are only to be found on one branch. Many of these "sports" when "fixed" are improvements upon older kinds. Cuttings taken from the branch or part of the plant which "sports" will usually produce flowers of the same color again. If they and the plants raised in turn from them continue to do so, and the departure becomes a permanency, the sport is said to be "fixed;" and if this fresh break is of a new or desirable hue and character, or in any manner an improvement upon existing forms, it receives a name, is propagated, and introduced into the market. There are occasions, however, when

a sport will sooner or later revert to the original color, and, as a matter of course, it becomes worthless.

There is no earthly reason why a new variety obtained from a sport is not, to the full, as good as one obtained from seed. Many forms of the incurved class have been procured in this manner. It may be said that the general system of growing Chrysanthemums for the sole production of large blooms is not favorable for increasing the number of new varieties by sports, on the ground that the plants are denuded of the side shoots as they grow, and it is from these very side shoots, when they are permitted to develop themselves into flowers, that the largest number of sports are obtained. In the Japanese class the fewest sports are found. With scarcely an exception all sports are the counterparts, in foliage and habit, of their parents; and there cannot be the least doubt that some of them possess better constitutions and produce finer flowers than their originals, or that they are, in some respects, improvements upon their parents.

The Seedling Chrysanthemum is not "like angels' visits, few and far between," but on the contrary, it is the rule and not the exception. Save a comparatively small number of sports, all the varieties of the Chrysanthemum that are in cultivation have been raised from seed at one period or another; and it is of course only in this manner that really new and distinct kinds are to be obtained. It is regarded as a curious fact that in England, where the growing of the flower is second only to that of China and Japan, for many years past, and until quite recently, few, if indeed any, attempts have been made to raise new seedling plants, although in the early days of its cultivation a number of what were then considered remarkably fine varieties were obtained from seed. Owing to the damp and unfavorable conditions of the English autumns, so much difficulty was experienced in ripening the seeds that the attempt was relinquished, and nearly all the novelties displayed in that country were obtained from raisers in Japan and France, with a few from the islands of Jersey and Guernsey; and the confession is made that in recent years, we Americans have taken up the industry with such great zeal and energy that we have supplied to the mother-country several hundred of more or less fine and valuable introductions with stronger constitutions, thus enabling seed of the Chrysanthemum to be again grown in England.

Within the last three or four years fresh attempts have been made in this direction in England, and they have not only resulted in some really surprising successes, but they have demonstrated the fact that in the damp, smoky, and humid climate of England, well ripened seed can be produced with considerable certainty from American varieties, and that such seed, if saved with care, will afford a large proportion of varieties fully the equals, and in many respects the superiors, to the bulk of those imported from other countries.

In the raising of plants beware of their enemies. That they have enemies is beyond all question. Chief of these are dampness and pestiferous insects. The first is easily overcome by the simple application of moderate heat constantly passing over and around the plants; but the second is not so readily vanquished, especially if permitted to become numerous upon the plants. Then it is that

> "Diseases desperate grown,
> By desperate appliance are relieved, or not at all."

The one great disease to which the Chrysanthemum is liable is mildew. It appears in the form of a white, woolly-looking growth, mostly on the under sides of the leaves. In its nature it is a fungus, and in a close atmosphere it spreads rapidly, and sadly impairs the functions of the foliage. The simplest and it may be the best remedy is sulphur, and if this is applied in time it will generally check, if not immediately cure, an attack.

One of the best qualities which this flower possesses is the long time the blooms remain fresh, either growing on the plants or in a cut state; still, greatly to the disappointment of many growers for exhibition, they ofttimes fail to keep long enough; and thus a large number of fine blooms are rendered useless through the too early development of some of the varieties. As to the cut blooms intended for exhibition, there is in reality no royal road to success with regard to their perfect preservation for a greater or less period. Much of this success will depend on good luck and the state in which the blooms were when cut from the plants; and if they should remain in such complete condition as to gain you the prize at the exhibition, thank the blind goddess Fortune therefor.

It is an undisputed fact that there is much misunderstanding

among growers of the Chrysanthemum, as to what qualities do in reality constitute a good bloom. Size is the first object a cultivator has in view, but this in itself is not enough, and must be accompanied by other good points before the flower can take rank as a first-class specimen. These several points or qualities may be set down as size, depth, solidity, breadth of petals, form, finish of flower and foliage, freshness, and most certainly color. I do not know as there is any absolute size to which the various classes of the Chrysanthemum may be grown at the present day, or to what perfection it may attain in the future; but this I feel well assured of — given the qualifications of depth, solidity, breadth of petal, form, finish, freshness, and color, then the larger the size to which you can bring it, the greater the prospect of carrying off the much coveted prize.

Here permit me to say that the rage for this unquestioned and unquestionably charming flower being still on the increase and its capabilities to all appearances being inexhaustible, a most inviting and remunerative field is opened up for the energies of all those who have the means, time, and patience to embark in its culture.

The folklore of the Chrysanthemum is very limited, and is confined to China and Japan. In the former country there is a proverbial rhyme connected with it, which may be translated as follows:

> "In the second month the Peach tree blooms,
> But not until the ninth the Chrysanthemums;
> So each must wait till his own time comes,"

which, as I take it, is a somewhat refined way of saying "every dog has his day," and so the charming English poet, Henry Kirk White, sings:

> "Say, what retards, amid the summer's blaze,
> The autumnal flower, till pale declining days?
> The God of Seasons, whose pervading power
> Controls the sun, or sheds the fleecy shower;
> He bids each flower His quickening word obey,
> Or to each lingering bloom enjoins delay."

The Japanese have a fancy that the dewy juices in the heart of the Chrysanthemum are the "Elixir of Life."

The poets, in a great measure, have paid little if any attention

to the Chrysanthemum, but appear to have expended nearly all their genius on the well-deserving rose, and other flowers.

Here is a translation of a poem, by Satoni Sensei, a native Japanese:

"O bloom of Chrysanthemum,
Fabled of old,
A fountain of rapture
And sweetness untold —
The dewy wine sparkled
With life in its flame,
And mortals partaking
Immortal became.
But lo! There hath opened
A wonderful flower,
For God's love hath blossomed —
Soul life in its dower,
And its petals shall shine
More endearing than thine,
With their fabulous treasures of life-giving wine, —
Far fairyland's store, —
And its dewdrops shall glow,
And its fragrance shall grow
From more unto more
While the years come and go."

We are indebted to Dr. Walcott, of Cambridge, and Mr. W. K. Harris, of Philadelphia, who were pioneers in fertilization of the flowers in this country, for varieties which they have produced. They were instrumental in creating a wide interest in the flowers. Later Mr. Thomas H. Spaulding, of New Jersey, and Mr. E. G. Hill, of Richmond, Indiana, took up the cultivation.

There is one thing to which I wish to call the special attention of your Society, that it may, I trust, be abandoned: it is the unsightly staking of Chrysanthemum plants with willow and other stakes, reminding one of a cripple supported on crutches. They have neither grace, finish, nor even presentable foliage, or flowers with either form or coloring. If judged by a correct standard of coloring and finish or foliage, all would be condemned, and relegated to the rear. While the late exhibit showed wonderful specimens of single flowers, the plant exhibit was anything but creditable as compared with the cut blooms. I trust that the coming season plants will be judged by a standard of blooms, by finish and luxuriance of foliage, by the form and color of bloom,

and that the plant shall exhibit only its flowers and foliage, and not a forest of unsightly sticks supporting a weak stem with little or no foliage, and colorless flowers.

I agree with the writer who said the nomenclature of the Chrysanthemum has not been much improved. Nearly all the names are of private persons, which, of course, to the great mass of people are as arbitrary and meaningless as "S.T.1860X," or any other cabalistic combination, and yet there is always the possibility in the case of every variety of Chrysanthemum of a perfectly happy and descriptive name. Here is a certain Chrysanthemum, for instance, with a great many riotous, rollicking red flowers growing upon it, scattering themselves about in a perfectly drunken way. There is one name that suggests itself instantly in connection with this flower: it ought to be called the Tam o' Shanter. Every bloom suggests the intoxicated Scotchman looking back in terror at the pursuing fiends. But what is the flower named? J. Collins. Tom Collins would have been better.

The first Chrysanthemum exhibit for prizes in this country was made at the Massachusetts Horticultural Society's Exhibition in 1861, and the prizes amounted to $17. In 1868 the exhibition was first styled the Chrysanthemum Show, and the prizes were increased to $55; this exhibition was an entire failure. Up to 1868 these shows were on Saturdays, from 12 to 3 P.M., but in 1879 it was held on Wednesday, from 12 M. to 10 P.M. In 1882 the prizes amounted to $121. Though planned for one day, it was kept open two days on account of the excellence of the exhibit and the interest taken therein. It continued in this manner each year until 1886. The prizes were increased, and in 1887 amounted to $741, and in 1896 to $1,200, the exhibit lasting nearly the entire week.

It will be observed that interest in the Chrysanthemum has steadily increased year after year until the last season, when the Exhibition of the Massachusetts Horticultural Society exceeded all previous ones in beauty, size, finish, and coloring of the flowers —and even surpassed the expectation of the most ardent admirer of the beautiful Queen of Autumn, excelling all exhibits in the United States, and, it is believed, not outdone in any part of the world. In the attainment of this grand result, the Massachusetts Horticultural Society can justly take a large share of credit, with its encouraging, generous spirit toward exhibitors, entries being

free to all. Boston may well feel a just pride in the efforts of the growers who have made it possible to give to us such a regal show as they did the past season.

To the public a debt of gratitude is also due. Nowhere in the world do the people pay, and willingly, so high a price for a fine Chrysanthemum as the residents of the great and good old city of Boston. It is these elements that contribute to bring about such grand results, which would be impossible but for them.

In drawing to a close, permit me to say that I regard the future of the Chrysanthemum as assured. The advances made in its improvement have added greatly to the grace and beauty of the flower, and popularized it until it has won a permanent abiding place in all hearts. It will, indeed, be a bold flower which will be able to displace it, or even disturb its queenly hold upon us. The public, in time to come, will undoubtedly require, for the embellishment of the home, flowers of a smaller type, but of equal finish and color with the larger and more regal varieties, yet both will hold their proper place, and will equally delight and gratify our taste for this most attractive flower.

At the present time we stand simply on the threshold of its future, great as its advance has been in the past decade only. We have a right to anticipate those improvements which technical schools of chemistry, electricity, and kindred science are sure to bring. There should be no hesitancy in pressing on. The goal of ultimate success is already in view, and when that is reached there can be no further doubt of the established value of the Chrysanthemum in a mercantile sense, while æsthetically in bringing it to its highest pitch of perfection and beauty you will have succeeded in making it a joy forever.

Discussion.

Kenneth Finlayson asked, How can we bring specimens here without staking?

Mr. Wood answered, By almost any method but that used heretofore; they can be trained to wire supports.

Mr. Finlayson still thought that they could not be brought here without staking.

Mr. Wood thought that wire frames would be effectual, but he had not looked into the subject.

Thomas Harrison spoke of training the plants in a pyramidal form.

In regard to the application of sulphur, Mr. Wood spoke of using it, sometimes directly and sometimes on steam-pipes.

Mr. Finlayson inquired of Mr. Wood whether he used any particular fertilizer. The answer was that he had not tested all, but uses sheep compost, compost from horned cattle, sulphate of ammonia, and nitrate of soda.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 30, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following is an abstract of the lecture given:

PLANT BEAUTY.

By HENRY T. BAILEY, Massachusetts State Supervisor of Drawing, Scituate.

There are different kinds of love for flowers. There is the scientific love; those who have only this seldom get the true message of the flowers. At the other extreme are people having a sentimental love for flowers; they pronounce their colors marvellous, and gush indiscriminately over their beauty. The third kind of love for flowers has a basis of intelligent appreciation. The greatest enjoyment is when scientific love is combined with a sympathetic appreciation of beauty.

Plant beauty is of two sorts, beauty of color and beauty of form. In some plants, like the calla, beauty of form predominates; in others, like the pæony, beauty of color; in still others, like the gladiolus, the lines of stalk, flower, and bud are as noticeably lovely as their colors. In the rose we have beauty both of form and color. Plants conspicuously beautiful for their form should not be gathered together in tight bouquets; each should be enjoyed by itself or with two or three companions so grouped in a vase or other receptacle that the beauty of the lines of each is enhanced by that of the others. Plants of lovely color, on the other hand, are more effective when massed. One snowball is insignificant; a bushel basket full of branches crowded

with the balls of creamy white glowing against the rich green of their foliage is highly effective. In the arrangement of flowers of beautiful form, we have much to learn from the Japanese.

The "Studio" for October and December, 1896, has suggestive articles, with more suggestive illustrations, of the fine art of flower arrangement as practised by the floral artists of the Sunrise Kingdom. Mr. Conder's book, "The Flowers of Japan and the Art of Floral Arrangement," to be found in the Library of this Society, will repay thoughtful study. Even the suggestions from Japanese prints, now so easily obtainable, are not to be despised by the wide-awake florist.

The chief element in beauty of form is curvature. Ruskin says there are two kinds of curves, the mortal and the immortal. We love immortal curves — the simple curve of force, the reversed curve of grace, and the spiral. The curve of force is shown in the sky-rocket. Water shot out of a fountain takes the same curve; so also does the stem of the golden-rod. Reversed curves and spirals are seen in the unfolding of a fern frond. [These were further illustrated by charts and blackboard sketches.]

Another element of beauty is radiation; either from a centre, as in a snowflake, or from some point outside the centre, as in a palm-leaf fan. The effect may be bi-symmetrical, as in a scallop shell, or balanced, as in a begonia leaf.

Our fathers preferred the bi-symmetrical arrangement. It appeared in the little tight headed bouquets brought to church, and in all manner of decoration. It was even supposed that houses must be bi-symmetrical — that is, that the two sides must not only balance each other, but must be uniform in shape; and inside the same bi-symmetrical arrangement was thought necessary, even to the placing of photographs and vases on the mantel.

The arrangement evidently preferred by nature is that of balance. This is illustrated by a leaf where the portion on one side of the mid-rib is smaller than the other, and perfect balance is secured by the curvature of the mid-rib and stem to the needy side. The Arethusa poised on its stem is another fine illustration. Balance may be seen illustrated in the lines of the hand. It controls the position of the leaflets of the rose and sumach. The Maine woodsmen know that trees are so balanced that if but an inch of wood is left under the centre the tree will stand. A stem of grass shows the balance of parts which make it self-sup-

porting. The grouping of plants or sprays is to be governed by the law of balance.

Beautiful color has such qualities as purity, gradation, and depth, and when colored flowers are massed, harmonious relations of the different hues should be secured.

All color comes from the sun. The standard colors are red, orange, yellow, green, blue, and violet. The first quality in color is purity. Color must not be muddy, as is often seen in novel varieties of pansies.

There are five typical color groups or harmonies. The first may be called a contrasted harmony. All green-leaved plants with white flowers are in this group. The second is dominant harmony, produced by combining tints and shades of one color, as, for example, a head of hyacinths or a bunch of double violet asters with no green foliage in sight. This combination of tints and shades, so common in the decorative arts and in dress goods, is rarely found in nature, and is least satisfactory as a harmony. The third is analogous harmony, composed of related hues of color. All green-leaved plants with yellow flowers are in this group. A bunch of gladioli tinted with violet-red, crimson, rose, scarlet, and salmon forms an analogous harmony of exquisite beauty. The fourth is complementary harmony — a harmony brought about by the juxtaposition of complementary colors. A violet red camellia seen against its glossy green leaves is a complementary harmony; so, also, is a bunch of violets with their yellow-green leaves. Another beautiful example is the marsh St. John's-wort, the leaves of which are green-blue, with a thick bloom, while the flowers are an orange tint, thus giving two complementary colors. The rocks at the seashore are in the orange scale, and the water being in effect a green-blue we have complementary harmony. Inland the rocks are covered with lichens of gray color, to contrast with the grass. The crags of the Alps are orange, from the orange-colored lichens growing there, making a tone complementary to the color of the sky. Such facts seem to prove that the Almighty who made these colors loves harmony. "He hath made everything beautiful in its time."

The fifth is perfected harmony: a color group composed of analogous hues combined with a color complementary to the general effect of all the group. For example, the gladioli form-

ing an analogous harmony if placed against a background of old ampelopsis leaves, of rich, bluish-green color, would be greatly enhanced in color effect, and the whole would form a perfected harmony. A bowl full of pansies is in perfected harmony. The analogous group runs through varying hues, from pure yellow in the flower centres to the yellowish-green of the foliage. The complementary to the effect of this group is to be seen in the rich purple of the petals. [Charts, diagrams, and bouquets of flowers were used to make this clear. The complementary and analogous colors were illustrated by means of the Bradley color wheel.]

The American people are becoming more sensitive to beauty every year. The florists who furnish flowers to decorate their homes and halls can do much to elevate public taste. A really beautiful thing is always attractive. What was true for Emerson is true for us all. Speaking of beauty he said:

> "When first my eyes saw thee
> I found me thy thrall."

It costs no more to make a beautiful bouquet than to make an ugly one, and ultimately he who produces beauty gives the greater pleasure and receives the larger reward.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 13, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

THE SWEET PEA, THE FLOWER FOR EVERYBODY.

By Rev. W. T. HUTCHINS, Indian Orchard, Mass.

It is simply impossible that either the commercial or the popular interest in floriculture should decrease. In such a country as ours it must not only increase, but for some time to come the very ratio of this cumulative growth of interest must increase. The demand for florists' stock, the seed patronage, the organization of floral societies, and the popularizing of exhibitions, — we see all these increasing with phenomenal rapidity. Indeed, more

remarkable than all these is the wonderful progress made in the past ten years in evolving improved forms and multiplied varieties in many of our garden favorites. Our country is still in but the infancy of its floral development.

It is easy of course to glut the market and make it appear that the florist's and the seedman's business is overdone. But a whole continent of educational work is before us, in which men, women, and children are to awake to the floral needs and joys of their nature. We have not begun to put the art of floriculture where it belongs — in the very van of the finest arts. The arts of painting, drawing, and sculpture long ago attained the dignity of having schools, and masters, and pupils without number, and a splendid patronage. The musical arts are on a basis of careful training, and our admission to civilized society almost depends on our either being musicians of some sort or having an educated appreciation of music. These things have asserted their right to the name of "art," and to universal recognition. But floriculture is in its undeveloped stage. It is still little more than a voice in our nature crying for attention. It has won as yet from people generally only enough response to prove that it is destined to become an art of arts for our universal pleasure and profit. The "fine arts" are indoor arts, and since one-half our life is spent indoors the refinement of society has been shaped accordingly into the arts of the parlor and the drawing-room. But our Creator turns us outdoors for the other half of the year, and here in this country we are only learning how to use our summer leisure, and in what direction to look for outdoor pleasure. Our American life is being redeemed from a state of grinding toil. We have largely passed the pioneer stage of hard grubbing for a living. As fast as we get above the level of a precarious livelihood we have time coming back on our hands, or at least can afford to take time for healthful and enjoyable diversion. Home may mean a bed, a table, and a roof, at first, but as surely as we prosper home comes to mean things beautiful within and without. A well-kept lawn and blooming garden are inevitably in the line of our mental and social development, and we get them at about the same time that we have means, leisure, and appetite to devote to these things.

Some very interesting conclusions in this direction might be drawn from the multitude of letters I receive from men of all

professions. The time has gone by when floriculture was an effeminate diversion. Of course when virile men are busy opening a continent to commerce, and wrestling with the stern pioneer facts that dispute every inch of a man's progress towards success in any business, they are not thinking about posy beds; but as surely as a refined and intelligent man gets beyond the critical stage of his business or professional development, the tastes of his mind will come to the surface and he will yield to the sweet seduction of such diversions as have restful pleasure in them; and, speaking for this mundane world, the very man who is running under the highest pressure of business is the man who must yield to the enticement of some pleasant hobby or speedily terminate his suicidal career. I do a good deal of floral preaching outside the pupit, for I consider that there is no higher humanitarian mission than to persuade men to wed some hobby that shall make them absolutely forget their daily vocation for an hour or for a half-day. I will challenge any man to find an avocation that will more restfully exercise and at the same time divert body, mind, and spirit than some special line of floriculture.

A short time ago floriculture was what it was to your dear old grandmother, a medley of confused flowers. But a new era in floriculture has dawned. Life is now too short to master even one flower as we have come to understand it. A man deserves to be knighted who takes some sweet floral nymph of the woods, or some old-fashioned favorite of our childhood garden, and makes a royal family of it, unlocking the mysterious colors that are hidden in its pale bosom, and turning one modest little Cinderella into a hundred queens of beauty and proud grace. What Mr. Eckford has done for the Sweet Pea, a score of other consecrated noblemen have done for other flowers. The time has not come to canonize these men. They have come through the humble walk of being some rich man's gardener, or they are down on their knees in communion with the soil, wearing the poor man's clothes, earning the pittance of a struggling florist, happy if some lady will pay the cheap price of a nosegay. But if you will believe it they are ushering in the day when floriculture will be the queen of arts, and when men of the proudest ambition and intelligence will aspire to have their names associated in monumental remembrance with the development of some flower. We

have carried nothing to perfection yet. One by one the flowers that have great possibilities in them make their advent into this new era. They have only made their graceful bow to us. You have only begun to know a flower when you see it as it is. You must have the prophetic anointing and see it as it is to be.

I felt deeply touched as I went into the dwarf canna house at the Royal Horticultural trial gardens with Mr. Eckford and heard him, as he stood before the flaming cannas, say he would like to begin life over again and devote himself to them. It was the soul of this old florist, who is through his work, that looked into the future of the dwarf canna and saw the vision of its coming glory. To see a flower with the heavenly eye, and love it with the heavenly heart, is to drink in its full prophecy, and it is that which consecrates the florist and lifts his business above the slime of commerce to the ethereal purity and pleasure that God has hidden in his beautiful handiwork.

I know we are living in the football era, and men gravitate towards half-civilized and even brutal athletics, and call it pleasure; but floriculture is at the other end of man's development, and is both beautiful and manly.

I have tried to study one flower, but not a day passes when I do not blush because people write to me as if I knew something about that flower. I know enough now to know that I know almost nothing about it. I am in love with it — wedded to it — learning about it. I have put ten years of hard work on it, but it is too deep for me. I wonder if your roses and your carnations impress you that way. I am sure you have a man's work before you, to master the rose and the carnation. How wonderfully their increasing beauty rewards you, and yet keeps you humble. It is a grand thing to be occupied with something that rewards you with pure pleasure and at the same time gives you a humble estimate of yourself. That is the divine mission of floriculture. Take any flower you please — there is room enough for mental and spiritual expansion in any one, and your pride will have as many falls as there are days in the year. Pardon this ministerial digression.

Now let us take a little history of the Sweet Pea. So far as I can learn, François Cupani, an Italian botanist in Sicily, about 1700, was the first cultivator of this flower. There appear to have been four original varieties, two of them natives of Ceylon

and two of Sicily. Linnæus makes these four native sorts pretty plain. It is possible that there were but the two of which De Candolle speaks, the *purpureus* and the *roseus*, and that the other two are variations of these.

The *purpureus* must have been very nearly like our common light blue and purple of the trade, for this is perhaps the commonest "rogue" to which the new sorts revert. It comes into the growers' fields everywhere. Then the original of the old Painted Lady, the pretty pink and white that everybody loves, must have been the native Ceylon variety called *roseus*. But there was an original red sort, and it appears to have come from Sicily with the purple. The *roseus* from Ceylon seems to have varied from pink and white to white. Going back thirty years from today to the beginning of the work on the modern Sweet Pea, we find these four originals, which probably show but little change from 1700 to 1860. I suspect that these original sorts broke into red and purple striped a good while ago. Call them varieties, and as late, say, as 1860 there could only have been the original purple, red, pink and white, white and red striped, and purple striped. Indeed when you study the seed business you very quickly get from modern history into ancient, and even the length of one generation will take us into that dim past. But the last thirty years have been a revelation and an opening era.

The first note of improved work on the Sweet Pea that I have states that Brown of Sudbury, England, received a certificate on Invincible Scarlet in 1865. It was put out by Carter of London. Then in 1867 we find the first improvement on the original purple, being given the name Imperial Purple, and leading the way to the Black.

About this time it appears that Cattell, of Westerham, had worked on the red striped and put it out under the name of the Queen. The next step was the introduction of the Crown Princess of Prussia, the mother of light, flesh-pink Sweet Peas, by Haage & Schmidt, of Erfurt, about 1868. Later the Violet Queen, put out by Carter, and then the Butterfly, by Sutton, in 1878. Carter put out the names Invincible Black and Invincible Scarlet Striped about 1880. Soon followed Lilacina Splendens, now a doubtful variety, although we still have the name Splendid Lilac. I suspect this latter is what more commonly became the Captain Clarke. The next decided acquisition of color was

Adonis, put out by Carter about 1884. The name Dark Red is from Benary, of Erfurt, and was a development doubtless from the original red.

We come now to the history of the Sweet Pea of today. Henry Eckford, of Wem, Shropshire, England, started into the specializing of this flower about 1876, the earliest notice of his offering anything being 1882. Mr. Laxton, of Bedford, also started in this race. Exact dates are not easy to determine. Novelties are exhibited at the flower shows sometimes two or three years before their introduction to the trade. Bronze Prince was certificated to Mr. Eckford in 1882. Carmine Rose, put out by Hurst, was certificated in 1883. But Mr. Eckford has dropped out everything offered before 1885. His really creditable introductions began with this date to be offered in rapid succession. Names of his that he has ceased to list are Bronze Prince, Queen of the Isles (this is still listed by the trade, but not by Mr. Eckford), Miss Ethel (long since dropped), Mauve Queen (the name under which Countess of Radnor was first certificated).

A word here about Mr. Laxton's work, before speaking more particularly of Mr. Eckford's. Mr. Laxton's son told me that his father had made a large number of crosses in Sweet Pea work, but with little satisfaction. He introduced Invincible Carmine and Invincible Blue, but the Laxton varieties now of most decided merit, having some originality of color, are Etna and Madame Carnot, 1891, Carmen Sylva and Rising Sun, 1892, and Princess May, 1893.

And now for Mr. Eckford: "The Garden," of London, has just paid him the compliment of dedicating its fiftieth volume to him. Mr. Eckford is now seventy-four years old. I found him at his pleasant Wem home in apparent patriarchal vigor in the summer of 1895, but since then his health has been broken and his work is probably done. His son John Stainer Eckford will succeed to the business. "The Garden" recites the record of Mr. Eckford's service from 1839 to 1897 in the employ of various gentlemen of title and wealth. I will insert here this valuable record verbatim:

"Mr. Henry Eckford was born at Stonehouse, in the parish of Liberton, near Edinburgh, on May 17, 1823. In December, 1839, he was sent as an apprentice to the gardens of Lord Lovat, Beaufort Castle, Inverness, where he remained for three years. He

returned to Edinburgh and then went to New Liston, the seat of Mr. James Hogg. He subsequently was employed as foreman in the following gardens: Fingask Castle, Perthshire; Penicuick House, Midlothian; and Oxenford Castle. In the beginning of 1847 he arrived in London with a letter of introduction from Mr. McNab, of the Edinburgh Botanic Gardens, to Mr. Hugh Low, by whom he was sent as foreman in the gardens of Colonel Baker, of Salisbury, then under the management of Mr. Dodds, who will be remembered in connection with the improvement of the Dahlia and other florists' flowers. He remained here for two years, afterwards serving under Mr. Fleming in the gardens at Trentham, and going thence to Cane Wood, Highgate. In 1854 he was appointed head gardener to the Earl of Radnor at Coleshill, Berks, where during his stay of twenty years he raised many Dahlias, Pelargoniums, and Verbenas, which were for the most part sent out by the late Mr. Keynes, of Salisbury. In the year 1878, Dr. Sankey, who was an enthusiastic florist, invited Mr. Eckford to take charge of his gardens at Sandywell, Gloucester, with the view to raising seedlings of florists' flowers. At this time the improvement in Sweet Peas had not been thought of, and in 1879 he obtained the best varieties of edible Peas and various Sweet Peas. He soon set to work and raised many fine varieties of edible Peas which are a gain in our kitchen gardens at the present day.

"To him is due the great improvement that has been made in the Sweet Peas, these more particularly having had his special attention of late years, and visitors to the Royal Horticultural Society's meetings will remember the fine collections he has on many occasions exhibited there. The Sweet Pea is the most valuable of all annual flowers of the present day; its delicious perfume, its diversity of lovely colors, its lengthened succession of bloom, and its value for cutting entitle it to a place in every garden. It may be had in bloom for seven months in the year from one sowing if care be taken to pick off every flower as soon as it shows sign of fading, not letting any seed-pods form. In order to obtain the best results from Sweet Peas, Mr. Eckford sows very thinly, with the result that each plant branches out and forms quite a bush. If gardeners would only sow their Sweet Peas, and edible Peas as well, thinly in good soil, they

would be astonished at the results. By thin sowing we get fine flowers and in abundance.

"The work of Mr. Eckford with the Sweet Pea shows how much may be done with simple and often neglected things in our gardens. The Sweet Pea certainly was always one of the most valued of flowers, but now, with so many delicate and lovely hues, Sweet Peas are a garden of beauty. Who knows how many other things in our gardens may not have in them the germs of like improvement? Even some of the shrubs that now have only one aspect for us may some day show us a like variety. In any case we owe many charming things for our open-air gardens to Mr. Eckford, and wish him many happy years more of his charming and useful work."

You would easily take Mr. Eckford for a retired professional gentleman, his face and figure hardly betraying the years he has spent as a gardener, and in hand to hand contest with the soil. He has been a priest of nature, and has grown old gracefully by reason of the masterly profession of extorting from Nature her deeper secrets. Some of his best life's work has been on Primulas, Cinerarias, and Pansies, he having received as high as sixteen guineas an ounce for some seed. His trials of culinary Peas were a revelation to me. I shall never forget how one day he allowed two ladies to wander at will through the grounds, and one of them came exclaiming, "Oh, Mr. Eckford, Mrs. ——— found a pod with thirteen peas!" Mr. Eckford knew too well just where every specially fine pod was, and even to touch one in such a sacred place was more than his years of gracious courtesy could allow. It is a rare privilege to enter such a floral workshop, and the hedge about it is high, and the tall gates are well padlocked, and there is a sentinel near by. I was shown into Vilmorin's floral workshop just out of Paris, and the walls about it are like State's prison barriers. There are no jewels that can compare in value with tiny seeds, especially after twenty years of special work are locked up in such a seed. In 1893 one seed, by some inexplicable law, produced a dwarf Sweet Pea. In 1896 the world was supplied with the product of that one seed, and whatever the merit of "Cupid" was, it certainly illustrated the enterprise of a modern seed-house in multiplying and distributing the product of so small a thing as a single seed.

Coming back to Mr. Eckford's work, we owe Boston a debt for

leading the way to the popular interest in the Sweet Pea. Your annual Sweet Pea exhibit was already a regular thing and creditable before the rest of us saw anything very remarkable in them. I remember with what kindness Mr. Robert Farquhar first gave me Mr. Eckford's address, and I never forgot his wise injunction to use the confidence with due caution. I did so as long as I could, but the wave of Sweet Pea interest swept over the country, and I felt that the truly American thing was to help it on in every way. I suppose Boston has reaped its share of the profit coming from the sale of probably one hundred and fifty tons annually of Sweet Pea seed in this country. Seven years ago your catalogues were cautious about recommending the Eckford novelties, and well they might be, for to this day very few of the imported Eckford packets show up well the first year in our rigid New England climate and uncertain soil. You must have them if you keep up with the procession. Almost every seed of these imported packets does well on the Pacific coast, and American grown seed one year from Mr. Eckford's introduction is strong and shows us these novelties very nearly at their best. No one who is well up on the subject of this flower questions the remarkable merit of the finest Eckford novelties. And I believe we are to put such competitive interest into this flower that we shall hold Mr. Eckford's novelties up to their highest standard in size and quality. Canada seems to suit them well. From letters received it is evident that enthusiasm there is running high on Sweet Peas. And places along our northern border, sections also where they have a rich alluvial soil, up in the Northwest and the whole length of the Pacific coast, — in all these localities they can smile at the difficulty of growing the finest sorts, and giant blossoms are no fiction with them. I receive through the mail the pressed standards of blossoms measuring an inch and nine-sixteenths in width. When you have a blossom that exceeds an inch and a half, it looks like a hollyhock to an enthusiast. One grower is at work on a giant-flowered strain. Another writes me that he is developing a strain with five blossoms to a stem. By these signs I have ceased to be anxious about the retrograde of these fine things. We are going to have seed soon that is not spoiled by the jobbers' calculation to the quarter of a cent per pound on the quantity harvested per acre. Giant-flowered Sweet Peas are not made in that way, nor held up to the Eckford type.

Now we have just come into Mr. Eckford's finest work. He has gone very cautiously. He has the soul of a careful, painstaking, conservative florist. And he has been among aristocrats enough to become a dear old aristocrat himself. He has not had to beg any favors from the trade, and now he says, If you want this new set of advance novelties the price will be fifteen shillings whether you take one set or a thousand sets. Heretofore we have been one year behind on his novelties, but by paying the retail price they are open to us without any conditions. We are already at the point of Mr. Eckford's finest work on each color, and the time has come to sift the list of varieties thoroughly, and discard a large number of inferior sorts. We can now select a royal group, and hold them up to the finest grandiflora type. We can bring the number down to thirty. Mr. Eckford still has a rich treasure in his advance seedlings. He has a white that will surpass all previous white sorts. He has finer blue than we have yet seen. Doubtless a great quantity of cheap seed will be grown for our common trade, and at current prices little effort will be made to grow such stock for quality, and, since the great bulk of Sweet Peas are sold in mixed form, the cheap pound and packet trade will be satisfied with this field-grown stock.

A word about Mr. Eckford's gardens at Wem. It is a short, pleasant ride down from Liverpool past Chester and Whitchurch to the old-fashioned, huddled town of Wem. After a few minutes' walk outside the town along the English lanes you come to a high-hedged floral bower with high padlocked gates, through which you see the bright evidences of high-class gardening. Here is Mr. Eckford's floral workshop, five acres in extent, soon to be enlarged to take in four acres more.

Mr. Eckford does not grow his trade stock here. Indeed, his great perplexity is to get his novelties properly grown for the trade. Of late his trade stock has been grown down in Essex, a great seed section.

The most noticeable part of his Wem garden is two acres of what he calls his seedlings. In this he plants all his selections of seed, from the latest work, of every color. From this field of seedlings he selects such as he wishes to prepare for trade introduction. It was a rich treat to wander back and forth through those two acres of rows. They are all bushed enough to keep them off the

ground. At every step I could see improvement on all those varieties that have been offered to the trade. And the new and richer colorings extorted exclamations of pleasure. Mr. Eckford's keen eye detected at a distance the flashes of improved color, and his enthusiasm seemed unbounded. Now he says, "I don't get a shilling from all this two acres." Of course not! This field of seedlings is his treasure house, and must be carried along patiently year after year to make selections from. The new shadings run in all directions. At Wem, on the soil there found, and under the favorable conditions for color and size peculiar to the English climate, the blossoms attain a wonderful perfection. The vines were not remarkably thrifty, and there did not seem to be the abundant florescence that we have at times on this side the water, but every flower had the aristocratic look, as if some master hand had grown it. Delicate shadings, that will be lost under our extremes of sun and cold, are there developed to the finest degree. It is beautiful to read the language of color under those English conditions.

Mr. Eckford kept to himself all the secrets of his method of making these beautiful varieties, but the results of his work were abundant all about. In making up a new set of novelties, Mr. Eckford puts in about three or four of the highest grade sorts, and fills out with others not so highly developed. I would not complain if he doubled his price on the best sorts, and kept the others back.

As fast as he makes a selection for a new set, he plants a row of each for his own stock seed, and tones them up to the best type and then sends that seed to his grower to grow trade stock. We have been disappointed quite frequently in the results we get from the Eckford sealed packets, but the source of the difficulty has doubtless been in the poor growing of the Eckford seed stock after it leaves his hands. Certainly, as I saw the rows at Wem in preparation for seed, the blossoms were in every case of the highest quality, and true to description. The English conditions for growing seed of this flower do not compare with our Californian conditions. It requires two years of California growing to get back the Eckford quality of the novelties.

As Mr. Eckford has been the chief factor in giving us the improved Sweet Pea, so California is the second great factor in the growing of this flower. On the invitation of C. C. Morse & Co.,

of Santa Clara, California, I spent the month of May, 1894, with them. The chief point at that time was to set them right on the names and types of the already long list, so that all stocks might be thoroughly rogued. It seems but yesterday since we doubted whether Sweet Pea seed could be successfully grown in this country. But California is today supplying the best trade stock we have, and we are exporting this seed to the countries that but a few years ago were our sole dependence. Even two years ago none of the foreign growers were keeping up with Mr. Eckford's novelties, and were taking pains only to preserve the purity of color of the reliable sorts. As compared to a California grower, who, to fill any possible contract for every known variety, does not hesitate to plant two hundred and fifty acres of this one flower, the foreign growers can hardly be said to be in the market. California has a wonderful strength of soil, cool nights and warm days, and, the rainy season coming just after planting time, the root growth is excellent, and at harvest time they are sure to have continuous sunshine. Their chief danger is over-production. Messrs. Morse & Co. plant Sweet Peas about as we plant corn, two seeds in a place. Up to the first of June they can get in with a hoe, and to rogue out the "off" kinds, and after that the vines lock in together, and, with never a wind to beat them down, the whole field rises from three to five feet high, forming a mass of bloom, and going evenly to seed. Other growers plant them in rows about seven feet apart, and work among them all through the growing season. They are careful about saving seed stock. While rogueing them they are on the lookout for the finest plants producing the best blooms. These are marked with a stake, and saved for their own seed stock. Rogueing out off colors is only one-half what is needed. Deteriorated stock should be pulled up also, and nothing should be allowed to grow but plants fully up to the improved type. But our jobbers do not take this into consideration in fixing contract prices, and drive the grower into harvesting everything that will make weight. The California grower needs to bear in mind that if his stock is in the least deteriorated it will show in New England far more than in the rich soil of the Pacific coast. We must say this about our best California growers, that they are very enthusiastic about their Sweet Peas, and now they have reached the most interesting stage of their work — the making of novelties. With such a large acreage

to go over, they have a grand chance to find advance marks in size and quality and variations of color. The American novelties of next year will show real merit, for they are the first that they have obtained from hybridizing. Mr. Eckford's stock is now in a highly hybridized condition, and as they plant a large number of his packets they frequently break into new things, and by crossing his finest sorts they break up and show many of the grand advance novelties that Mr. Eckford has been holding back.

I shall be expected to refer to rules for the culture of this flower. Those who failed last year had plenty of good company. Only one of our Springfield enthusiasts succeeded well. Nothing comforted me more than to hear from Mr. J. F. C. Hyde that he too had joined the ranks of the unfortunate ones. The causes of failure prevailed from one end of the country to the other. Every exhibit was made at a great disadvantage. I bent all my energy to escaping the blight, and succeeded beautifully in that, only to see my vines go up, up, up, ten feet, blossoming in a scattering way after they were five feet high. There were two main causes; the first was that we had no freeze or frost to check a rapid start, and this was followed by excess of rain through the growing season. One of the worst vices of the Sweet Pea is an occasional tendency to rank vine and no bloom, and last year we had exactly the conditions to produce that. The high culture we give them nowadays necessitates a slow germination and a holding-back by frost, to steady them down to moderation in making vine. I have been preaching to our people some about the principle of making a plant work, in order to increase bloom. The root is the part of the plant that works, and the stiffer or firmer the soil the more wholesome exercise the root gets. A vine like the Sweet Pea should not have a soft bed underneath it. It induces a less hardy growth of the plant. It indulges the root and weakens it for its after work. It favors a top growth beyond the power of the root to support it. It stimulates growth at the expense of bloom. We have been following the trench system, which means that people have dug down and filled in with loose soil and fertilizer, and the very looseness of this bed under our seed and vines has been enough to make mischief. It should be trodden down. We have weakened the plants by this soft treatment, and

then have imprisoned them at the tenderest age down four inches below the sunny surface of the ground, and suffocated them still more by filling in the earth before they were at all hardened. Hence the blight. I have in preparing directions for other people kept in mind those who have a more or less light loam in their gardens. For all others who have a clay loam I feel but little sympathy, because they ought to have fine Sweet Peas with only half trying. But we had better all of us be shy of the trench method. I have a soft spongy soil well enriched. I had it turned up with a plough last fall, running the plough twice through each furrow. I shall simply hollow out about two inches where my rows come, treading the soil down if I find it soft. I shall in these shallow hollows just scratch out lines an inch deep for my seed, and cover only an inch, and roll the soil above and along the sides. If you have clay loam it will settle enough; only do not make any soft bed underneath your seed. I believe in thorough spading in the fall for the purpose of mixing, but I should let the frost be my plough for the spring. I believe this firming of the ground, avoiding the other things that have smothered our tender vines, will stop the blight. I am greatly annoyed with ground moles, and shall resort again to tar paper, setting pieces one by two feet in size into the ground every few feet to prevent their running lengthwise of the rows — and catch 'em if you can! Of course you all plant your Sweet Peas as early as possible. If the Sweet Pea gave us no other pleasure, it bids us hail with delight that first premature spring day, after the frost is out of the warmest part of our garden, for that is the foreordained time to plant this seed, unless you continue to set apart Fast Day for this purpose. You know by experience that you must plant seed liberally enough to allow for various losses. I adhere to the plan of planting in double rows, sowing at the rate of an ounce to ten feet. You ought to use more than that if it is cheap mixed seed. But after all losses the plants should not stand nearer than three inches apart.

Now for the cutworm. Some of the devils that did not go into the swine went into this grievous garden pest. If I open my mouth to boast that I don't have many of them I shall surely have my pride humbled soon. I say in good faith that in so beautiful a thing as a row of Sweet Peas it is a disgrace not to come out ahead of this foe. I believe first in going at him in the

fall just as soon as the frost has spoiled things. You can burn rubbish over the ground, put on a good dressing of salt, and freeze them out by spading up as late as possible. Mr. Eckford recommended gas lime, and some of you saw an account of the way Semple, the great Aster man, ploughs unslacked lime into his soil. The fall is a grand time for making a piece of ground very unpleasant for cutworms or their eggs. I find virtue in the bran and Paris green treatment. A pail of bran with a tablespoonful of the poison stirred in, and sweetened a little, and sown on the surface, or lightly hoed in in the spring, is a simple remedy. Diverting the cutworms by planting something of no value alongside for them to feed on helps to save some choice things, but you will enjoy your breakfast better if, Samson-like, you go out and slay a hundred of them as an appetizer. The only thing this good advice lacks is some professional charge, for we follow advice only when we pay for it.

The past two seasons have brought another pest: I call it a louse; perhaps you would call it red spider. It begins at the base of the vine and colonizes on the under side of the foliage. Its presence will be seen by the whitish, translucent spots on the leaves. It must be gone at vigorously either with tobacco tea or a strong force on the hose sprinkler. I used the latter, but with the excess of rain last year it did make the vines grow most wonderfully at an expense of bloom. Last year was surely an "off" year and does not count. The other rules for culture are simple and threadbare. Bush or trellis strongly, and so as to give them room to ramble. Water freely after the blooming period comes, but not too much before. Run the rows north and south to give them both the morning and afternoon sun. You are favorably situated here for easy success in this flower — almost anywhere near the sea coast they thrive.

Discussion.

President Appleton here retired and the chair was taken by Vice-President Benjamin P. Ware.

In reply to an inquiry the lecturer advised for cutworms to use six quarts of salt to one square rod. He said he would never trench again, at least not deeper than the ordinary furrow.

Ex-President James F. C. Hyde said he had suffered from the blight. His vines have grown as high as ten feet. He said he

should never again plant in a deep trench and should be extremely careful about earthing up; early earthing is disastrous. The cut-worm is a great pest, but he would not recommend the use of salt; he would plant lettuce to attract the worms from the Sweet Peas or other crop, and use the thumb and finger; this is the best remedy. Eternal vigilance is necessary; go over the rows at least once, and better twice, a day. This is his method, and he has taken many prizes in his day. Black shallow soil is best, and he believes in firming it, as good flowers cannot be grown on light soil without a great amount of attention. Be careful about the seed, and don't expect to get good results from Eckford's seed at first. He still believes in Sweet Peas, and thought Mr. Hutchins had taken the highest position in regard to them.

Joseph H. Woodford inquired what fertilizer to use and when to apply it.

Mr. Hutchins answered that it was always best to aim to get the soil as fertile as possible. Use stable manure and trench, as it is important to get the food into the ground and to deepen the soil; with eight inches of well-firmed soil above the manure or compost you are pretty safe. Never apply fertilizer in the spring, but hold it over until fall. Commercial fertilizers, such as phosphates, act rapidly; these are not needed at first. He would not apply wood ashes in the spring. Bone flour can be used safely at almost any time. A New Haven florist puts four inches of tobacco stems in the bottom of the trench, with good results; they contain a large amount of potash.

Giving a list of the best sorts is very difficult, as it means something different to the florist, the lady amateur, and the pocket-book.

In whites the best is Blanche Burpee, and this is what the amateur wants. The Bride is the same. Emily Henderson is better for cut flowers if you can get it to bloom freely. Mrs. Sankey is good, but has rather gone by.

In pink-whites use Blanche Ferry.

For rose pink, Prima Donna, Royal Robe, and Katherine Tracey.

The best shaded pinks are Apple Blossom and Royal Rose.

Of soft flesh pinks Gladstone has given place to Blushing Beauty.

For a peachy pink use Lovely; this might be called a shell pink, and possesses good qualities.

In buff pink we have Venus, which is very fine.

For bright rose Her Majesty is the best; others are Oddity and Splendor, but we do not need these.

Deep rose is found in Mikado, which seldom comes striped; drop Adonis, as it is not good.

In light scarlet use Prince Edward of York.

For scarlet, Firefly and Harvard; drop Invincible Carmine and Invincible Scarlet. For deeper scarlet we have Mars. For a cherry red, Salopian, which, however, is very expensive.

For orange salmon use Meteor and drop Orange Prince.

For orange rose, Lady Penzance.

For reddish primrose take Emily Lynch and drop Duke of York.

For rich purple, Duke of Clarence.

For black purple, Monarch.

For indigo, Indigo King.

For dark maroon, Stanley.

For blue, Captain of the Blues.

In lavenders we have lost one; they are the hardest to make hold the color; use Celestial or Burpee's New Countess.

For reddish mauve, Emily Eckford and Dorothy Tennant.

For magenta, Captivation.

For claret, Waverly.

For primrose, Mrs. Eckford; still good.

For primrose cream, Queen Victoria.

For scarlet striped, America.

For pink striped, Ramona.

For purple striped, Senator.

For blue striped, Princess of Wales and Gray Friar.

For orange striped, Aurora.

For deeper orange, Coronet.

For description of these varieties the booklet of the Sunset Seed Company will be found valuable.

Frank O. Carpenter inquired about Cupid.

Mr. Hutchins replied that it has a certain historic value; we need a hybrid race which shall be half dwarf, and this variety seems to be what we have wanted to work with by crossing; this is its only value, as it has short flower stems as well as dwarf habit. It does well on the Pacific coast, and will do better here than it has done. It originated in a field of Emily Henderson in the fall

of 1893, one plant only being found. The speaker had no trouble in getting it to bloom.

James Wheeler spoke of Red Riding Hood as looking deformed rather than pretty, as though it was going back a hundred years, and said it is a shame to put bad things on the market.

Thomas Harrison said that the lecture took him back fifty years, when some Egyptian Peas sent him gave a race similar to the present Sweet Peas. It was supposed to have been found in ruins in Egypt, when Sir John Gardner Wilkinson was exploring there, and was sent to an English firm to propagate and introduce as a Vetch.

Robert Farquhar thought it was Vicia, not a Lathyrus; no improvement to the Sweet Pea has come from Vicia. Cupid is undesirable; we want size, color, fragrance, and length of flower stalk; also strength to the stalk. Twelve years ago very few Sweet Pea seeds were sold in Boston; twenty-five years ago the leading firm had only one and one-half bushels; now we have quantities. Seeds from England are beautifully developed; much better than those from France and Germany. The speaker said that in two years his firm trebled their sales. To Mr. Hutchins, more than any one else, we are indebted for the magnificent development on this side of the water, and more than one-third the specialists on Sweet Peas are in this country. Mr. Hutchins' short list of good varieties is very good; it is just what the seedsman wants. We have to contend with a bright sun, which they do not have in England.

Benjamin P. Ware said that the best fertilizer for edible peas is ground bone or flour of bone. It supplies phosphoric acid and is adapted to produce flowers and fruit rather than vines. He would use it for Sweet Peas also, putting it on in the fall; though its effects might not be seen at once they would be lasting. Cutworms cause market gardeners a great deal of trouble; acres of onions have sometimes been cut down by them. Wherever you find a Sweet Pea or other plant cut down by them during the night, which is when they do most of their work, you will, if you dig for him in the morning, find the worm near by.

Mr. Harrison asked whether Sweet Peas are subject to the pea weevil.

Mr. Hutchins replied that of late years there had been few in

fresh seed — not so many as formerly. He had seen none this year or last.

Mr. Harrison remarked that we had no yellow Sweet Pea.

Mr. Hutchins said that though a Sweet Pea called yellow had been sold, the color was only a suggestion of yellow. Putting a good many together and bringing them into the house in the shade might bring out the color. Golden Gleam may be a deeper yellow, but he doubted whether a true yellow would ever be produced. Nature makes laws which limit our going beyond a certain point, but we are rapidly getting towards a blue.

California seed comes true in England and in the continent; the speaker had never known it to fail. Mr. Eckford's seed is grown under special circumstances. He always sows it in moderate heat for germinating only, to protect it from the rigidity of the climate. Then they can be put in the open ground. They can be transplanted easily.

In answer to an inquiry Mr. Hutchins said that the list given is suitable for amateurs. The kinds recommended are robust growers.

The thanks of the meeting were unanimously voted to Mr. Hutchins for his interesting paper.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 20, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

In the absence of the author, the following paper was read by J. D. W. French, Chairman of the Committee on Lectures.

SOME PHASES OF MARKET GARDENING.

By T. GREINER, editor New York edition "Farm and Fireside," La Salle, N.Y.

It seems to me too bold an undertaking for an outsider to come before your celebrated body of practical horticulturists — the leaders in their chosen field — with the idea of enlightening you on any phase of the garden business. We are in the habit of looking to you and to the printed reports of your proceedings for instruction, and for new ideas and suggestions.

It is not improbable, however, that an account of the development of market gardening, and of the problems with which your brethren in these more western districts are brought face to face, may be of some interest to you. I had hoped to tell you of this personally, and perhaps receive in return some words of wise counsel and consolation — some suggestions how best to meet the difficulties which beset us here, and how to lift the business out of the mire and ruts into which it seems to have fallen during these "hard times." Circumstances and previous engagements, unfortunately, compel me to entrust my own side of the story to paper.

Not Flourishing. — At the outset let me say that the business here has not been flourishing for some years. Every gardener is complaining. We used to have a good market in our near cities, and coin money freely. Now the free coinage of silver in the market garden has become a myth. The great problem before us is how to manage so as to be able to continue in the business, how to earn enough to cover the wages of labor, and to make a bare living from the garden.

Causes. — The causes of this unfavorable change are not far to seek. It has been brought about by the general depression in the values of other soil products, and aided and abetted by the constant advice (not altogether judicious) of agricultural writers and the agricultural press. I know I am not free from blame myself. But look up some issues of leading eastern farm papers (the "Rural New Yorker," for instance) of half a dozen or a dozen years ago. See the glowing descriptions of the results of intensive culture, of the profits to be found in vegetables and fruits; of the freely reiterated statement that the eastern States were destined to produce horticultural rather than agricultural products. See the sensational teachings found in earlier bulletins of the New York Experiment Station, and in speeches of the late director (Dr. Collier) about the great profits from forced crops. Note especially the glittering and tempting assertion coming from so high an authority, that a quarter acre under glass would give greater returns than a hundred acres of farm land, the amount of $11,000 (if I remember correctly) being figured out as the proceeds from one acre under glass.

Ruinous Competition. — Then came the great slump in prices of cereals, potatoes, etc. A large number of farmers who pre-

viously had contented themselves with growing wheat, oats, corn, potatoes, and stock, finding loss rather than profit in their accustomed crops, and being tempted by the often extravagant promises held out to them of better returns in garden and fruit crops, forsook their legitimate products, and began to grow berries, onions, and a general line of garden vegetables. As a result, the markets became flooded with these products, and prices in many instances were forced down below the cost of production. So we older gardeners met loss instead of profit, and the new-comers in this field have found nothing but sore disappointment.

Possibly you, near the seashore, and with the wealth of the country concentrated around you, have been less affected by these changes than we were here. But I find from the market reports that the big eastern cities also were glutted with garden products, and prices have ruled lower than ever. Growers of forced vegetables of all kinds, too, have suffered from ruinous competition. Of mushrooms — once a great source of profit — there were at times more than could be sold. Hothouse tomatoes and lettuce were plenty and cheap, and there seemed to be in the markets a plethora of all vegetables and at all times.

Too much Instruction. — I believe that we have instructed too much. What used to be trade secrets are now the common property of the masses. Tuition has been practically free, and the masses have learned to grow articles the production of which used to be the business and privilege of the few. We have written too many articles, books, and pamphlets. Stations have aided with their bulletins, and societies with their free lectures and discussions. The urgent appeals for the production of garden and fruit crops have been too persistent and over-emphatic.

No Welcome for New-comers. — While the general effect in bringing the blessings of a fruit and vegetable diet within the reach of everybody who in any respect deserves to be called a consumer may be wholesome, thus justifying somewhat the course of those who have helped towards this result, we shall have to modify, if not reverse, our teaching of a quarter of a century or more, and now try to discourage the tendency of the many unskilled outsiders to rush into market gardening as a supposedly profitable business. There are too many producers of trash in it already. Market gardening has now entered a stage of development in which a thorough weeding-out seems imper-

ative and inevitable. The less skilled portion of its devotees will have to drop out, and only the fittest can survive. It is time for us to warn those who, having made a failure of general farming, clerking, store-keeping, or office-holding, intend to take up gardening without previous training and experience. If our efforts to scare them off are successful, it will be a favor to themselves as well as to those already in the business. It will prevent undesirable competition for the latter, and save the former certain disappointment and loss of time and money.

Trash not Profitable. — That the production of trash does not pay has been reiterated almost *ad nauseam;* and yet the markets are filled with trashy stuff that weakens and depresses the prices of even the better grades of goods. Really superior vegetables may suffer in this competition, but they seldom fail to find a fair demand and comparatively fair prices. In a few lines we secure even our old-fashioned good figures. Possibly the depressed condition of the market garden business may prove a blessing in disguise, by discouraging raw recruits from coming into our ranks, and by thus preventing a further increase of trashy production. Possibly with the return of old-time general prosperity (another period of which seems now about due us) the consumption of garden products can be increased to such an extent as to give us again paying prices for the general line of garden stuff and good profits to the skilled grower.

To restrict Production. — Meanwhile it is in order to talk of restricting the production rather than extending it, especially in those lines which seem decidedly overdone, as, for instance, in that of onions and tomatoes for the late summer and fall trade. This is largely a local question. What special crops one can produce with best prospects of profitable sales is a matter which each individual gardener must settle for himself. It would not be safe to point out special crops as promising better pay than others, for that would only lead to a general rush and a breaking-down of the prices of the products thus recommended for more general culture.

Cheapened Production. — The talk of reducing the cost of production may have a "chestnutty" flavor; yet I believe the story has not been half told. It is true that the skilled gardener appreciates and utilizes every new implement put forth as saving hand labor in the garden, from the newer style seed drill to the

Breed weeder and the Bemis transplanting machine. It is true that he tries to get his soil in shape to bring the largest yields, and that he crowds his crops, following one with another in rapid succession, so as to make the most of his opportunities. There is one point, however, in which almost all of us have blundered, and made ourselves guilty of sinful extravagance. This is in the matter of purchasing manures.

Buying Plant Foods. — Every gardener is a buyer of plant foods in some of their forms. In most cases we have paid excessive prices for them. When the finished product sells for so much less than formerly, the raw materials should be had at correspondingly smaller cost. Yet the general lowering of prices seems to have made an exception in the case of plant food materials. We still pay old time rates, and in many instances even increased ones, for stable manure. This form of plant food is a waste product of stock yards and livery stables. If gardeners in the vicinity of the cities could agree to be less anxious to buy it at whatever the seller may see fit to ask, the latter would have to sell it for what you — the buyer — might see fit to offer.

I myself am more fortunate in this respect than most of my brethren in the gardening and fruit-growing business. By sharp bargaining I obtain first-class mixed stockyard manure, from grain-fed hogs, sheep, horses, and cows, at $17 per large car well loaded (capacity of car 60,000 lbs.), delivered here at the station, a quarter of a mile from my gardens. A ton of such manure thus costs me less than 75 cents; and, at the same rates that we pay for plant food when buying of fertilizer men, is worth easily double that amount. But not everybody has such a chance. In some cases we may be able to draw on home resources, by making composts of dried muck with ashes and bone, or with other forms of mineral plant foods, and using such composts in place of the stable manure when that cannot be had except at an exorbitant price. I offer this only as a suggestion.

Concentrated Plant Foods. — The great majority of gardeners also use concentrated plant foods, and sometimes with telling effect. Yet in their purchase we have been careless and extravagant. I do not like to antagonize that powerful body of men, the so-called fertilizer manufacturers. We need their coöperation. They have had a mission. Like the nurserymen they had to send their agents among the tillers of the soil to induce them to

make use of a good thing. This agent system of selling, however, is expensive. Then there are bad debts, and debts of long standing, and interest on the investment and outstanding claims, and a heavy expense in advertising, and other outlays and losses, so that, taken altogether, the fertilizer men may have to charge us the going rates for these plant foods in order to make their old-time profits. But why should they not be satisfied with smaller profits when we and all the rest of the tillers of the soil are obliged to do this?

Pertinent Queries. — I will add a few more pertinent questions: Why shall we, who know what we are doing, and who try to do a fair and square business on an economical basis, help to carry the losses of poor sales when there is absolutely no necessity for it? Do we really need ready mixtures? Do manufacturers pretend to know more about the needs of our special crops in each special case, or on our special soil, than we do? Is one and the same mixture just what is needed for any one crop under all circumstances? Is it not absurd to talk about special onion manures, special potato manures, special cabbage manures, etc., when the conditions of the soil on which each individual crop is planted vary so much? Who will tell us whether a certain crop needs exactly six or eight or ten per cent of potash? Why will manufacturers sell their slightly differing mixtures of three simple food elements, in slightly differing forms, under twelve hundred different trade names?

Home Mixtures. — I can see no necessity for using ready-made mixtures in the garden, but the strongest reasons for avoiding that course. Let us examine the fertilizer analyses as given, for instance, in one of the latest bulletins issued by the New Jersey Experiment Station (New Brunswick). The mixtures sent out by our various firms as especially adapted for garden crops vary in real value between $20 and $26 per ton, and sell at from $30 to $40. In other words, the purchaser is asked to pay the full value of the article and an additional fifty per cent of its value to make good expenses and losses of the seller, and to swell his profits. Now if we buy the following ingredients:

500 lbs.	nitrate of soda, costing about	$11 25
1,200 "	dissolved South Carolina rock, costing about .	6 00
300 "	muriate of potash	6 75
2,000 lbs.	. . . . .	$24 00

we have a ton which contains about four per cent of available nitrogen, nine per cent of available phosphoric acid, and seven and a half per cent of potash (K_2O); cost us $24, is worth $27.90, and the equal of a fertilizer sold by manufacturers at about $40 per ton. Professor E. B. Voorhees, director of the New Jersey Station, suggests the following formula for garden crops, viz.:

Nitrate of soda	200 lbs.
Dried blood	200 "
Tankage	200 "
Acid phosphate	1,000 "
Muriate of potash	400 "
Total	2,000 lbs.

This mixture will analyze about three and a half per cent of nitrogen, eight per cent of phosphoric acid, and ten per cent of potash. In cost and value it is not materially different from the other.

Applying Plant Foods. — Some gardeners may fear the labor of mixing. But why mix these ingredients at all? Nitrate of soda and muriate of potash are as easily sown over the ground, broadcast, as wheat. Acid phosphate can be slightly moistened by sprinkling and working over on a tight barn floor, or in a wagon box, and then applied by hand. When we have a chance to effect a saving in cost of from $12 to $16 per ton, we can well afford to expend a little extra labor in application. My practice is to sow each ingredient alone, taking pains to distribute the proper amount.

Direct Dealings. — A prolific source of loss to us has been our carelessness in selling to irresponsible buyers, and in consigning products to commission merchants. For us here, the only safe way seems to be to deal directly with consumers, and in rarer cases with retailing grocers, for cash only. If we have superior vegetables, we can usually find private buyers willing to give a fair price. Our grocery stores are not satisfied with reasonable profits. Just at this time they are unwilling to pay to the grower more than from 25 cents to 30 cents a dozen for the very choicest of hothouse lettuce, while they are unwilling to sell the same at less than 10 cents a head. The only thing we can do is to hunt up consumers ourselves. Our way to treat commission

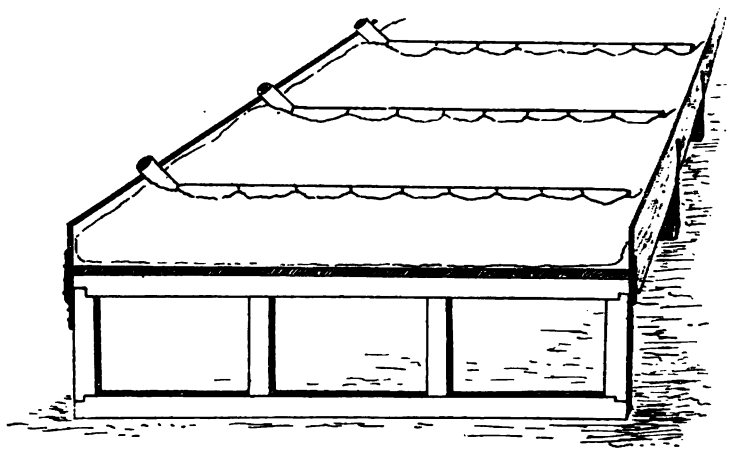
merchants is to give them no chance. If we ship anything to them we soon follow the goods, and keep watch of the dealer's doings until the money is in our pockets.

Nitrate of Soda. — No single plant food has ever given me the striking results which I frequently obtained by the use of nitrate of soda, especially when applied to beets, spinach, cabbages, and cauliflowers, either alone, as in the case of the former two, or in combination with muriate of potash, as in the case of the latter two. Sometimes the effectiveness of the nitrate has been further increased by the simultaneous use of lime, and maximum results have thus been secured at a minimum cash outlay. We have usually applied nitrate of soda at the rate of from 200 to 300 pounds per acre, and muriate of potash in slightly smaller quantity, both broadcast. These fertilizers are always worthy of trial in growing the garden products named, and perhaps in growing others.

Some Remunerative Crops. — The following brief remarks may suffice in regard to what we consider our money crops: Early peas come first, and we find them profitable if we grow only what we can dispose of directly to consumers. Strawberries, when properly managed, have never yet failed to give us fair returns, even when disposed of at wholesale to groceries and commission houses. We have quick sale, at good prices, for first early tomatoes, and the only trouble is that even with all the pains we take we can get only a small portion of the crop on our earliest plants to ripen before the great rush knocks the props from under the tomato trade. The Early Ruby type of tomatoes (including the newer Leader), which bloom and set fruit freely even on the young plants under glass, give us some very early fruit, and we are in hopes of finding before long a variety having these characteristics, with uniformly smooth fruit of fair size. The Prizetaker onion, grown on the plan of the so-called "new onion culture," has been one of our most profitable crops, and the Barletta pickling onion ranks very high with us as a money-maker. There is a good demand, seldom fully met, for these very small, white bulbs, and even when sold through the regular commission channels they have netted us over $3 per bushel. The crop is produced with little trouble inside of three months, brings cash returns early in September, and leaves the ground in good shape for a succeeding late crop, like celery, spinach, etc.

Among other crops that we can rely on for some profit are late cabbages, which bring from $12 upwards per ton; melons, especially of high-flavored varieties like Emerald Gem; and Hubbard squashes.

Newer Devices and Methods. — Few of the newer implements have been such a help to us as the Meeker smoothing harrow, although it has imperfections and the great drawback of high price. We now hope to find in the Clark's cutaway smoothing harrow an implement costing less than half as much as the Meeker, and doing fully as good — in some respects perhaps better — work. The Breed weeder and Bemis transplanter have already been men-



Bench, double width, arranged for sub-irrigation. Tiles laid in cement. This bench has been in use with me for two seasons.

tioned, and they are found to be great labor-savers. Among newer methods there are two which have left a deep impression on our garden practices: The one is the so-called "new onion culture," which has enabled us to make the Prizetaker and New Gibraltar onions very profitable within the limits of people's appreciation of mild flavor, and of their willingness to buy onions of very large size. The other is the new system of applying water to greenhouse crops, namely, by sub-irrigation. This seems by far the safest plan for lettuce beds, and it has enabled me to grow finer, larger, and healthier plants, especially of the hard-heading newer forcing sorts like White Perfection, New Hothouse, etc., than the old way of surface watering ever gave us. The accompanying

sketch shows the bench as I use it. The bench is made of a two-inch plank bottom with sides of four-inch board, resting on a frame of three by four scantling, and made water-tight by means of a cement lining. Lines of two-inch tile are laid upon the bottom across the bench, two or two and one-half feet apart, the end tile, which receives the water, turned up at an angle of forty-five degrees.

I shall have to pass over for this time other subjects which might be worthy of fuller notice, such as the need of more thorough cultivation of the home market and the hopes with which some of our brethren in these border towns look upon coming tariff changes as means to free them from the formidable competition of Canadian gardeners, and thus to bring about at least a temporary rise of prices in garden products.

In conclusion, let me express the hope and wish that the return of old-time prosperity may be close at hand, and that we may thus be relieved of all further anxious speculations and doubts as to the future of market gardening. We have full faith that all will turn out well in the end.

Discussion.

Benjamin P. Ware said that he had been pleased with the character of this paper, and happily disappointed. It had not told us of the theory and practice of market gardening and he was glad of it; it had given us what we need. As the prices for produce diminish we must adopt some method to reduce the cost of production, and the importance of reducing the cost of production has been brought out. In business today we find the waste products are used to manufacture new articles, but we farmers and gardeners are the most extravagant of all. He wanted to emphasize that we can save one-third or one-half the cost of fertilizers by mixing them ourselves. We must buy the raw materials and mix them ourselves, and use what our crops require. The mixed products on the market are not what we want. He did not know why such mixtures are made. We must learn from the experiment stations what we need, and mix as our plants require. Mixed fertilizers do not supply that. Professor Jordan, at a farmer's institute in New Hampshire, which the speaker attended, emphasized the idea that we should contract with agents for the materials, and that a saving of fifty per cent can be made by

so doing. Advantage must be taken of these things; we have put before us in bulletins what we need for our plants and animals as well. Mr. Ware asked his fellow-farmers and market gardeners whether they were willing to pay this extra profit to the manufacturers. If they were they might do it; he would not. Mixtures are all humbug; names are used to catch your eye; if one does not, another will. He approved of the method presented: we must see where we can save anything and save it if we wish to succeed. Mr. Ware concluded by calling on one of our fellow-workers, Mr. Sullivan, of Revere, whom he saw in the audience.

Mr. Sullivan, after thanking Mr. Ware for the call, said: Labor is the first great expense, but if we try to reduce the wages of our laborers, and thus reduce the cost of the produce, we commence by making our own townspeople poorer; they must live, and their children must go to school. As it is now, they have a hard time. Italian laborers are now getting plenty, and work for very small wages, but is it desirable labor to hire? We have given them a fair test, and find that to a certain extent they can be employed, as for weeding and the like, but if you do not have an interpreter you cannot explain to them what you want done, and a foreman is required to stand over them continually. They are willing and good workers, but as they cannot understand the English language we have come to the conclusion that we cannot afford to reduce the wages of present laborers. Another point is the cost of manure; this has been well explained in the paper. We are paying too much already. In the city of Chicago, and some other large cities, manure is given to the gardeners by the stable-keepers; the gardeners thus get it for the hauling, which often amounts to $3 or $4 per cord. This is a help. Mr. Sullivan said, in regard to fertilizers, that he had used them in all forms, and understood all about the manufacture of them and the ingredients used. Taking the material in gross, there would, without doubt, be a saving of fifty per cent, but mixing this material is not general, and many have not the intelligence that Mr. Ware has to put into the mixing. If the fertilizer dealers would be satisfied with small profits, say $25 per ton for their fertilizers, the farmers would be satisfied. Some fertilizers must be used, but we are at present dissatisfied with what are now on the market. The manufacturers will come down, and the sooner the better. We are protected by the experiment stations, so that

the fertilizers put on the market are true to the percentages marked on the bag, but the price is so high now that we are driven to lessen the consumption.

Hon. Aaron Low expressed his appreciation of the lecture. The great problem in market gardening, he said, is the production of crops at low cost. If we cannot get the price necessary to pay expenses, we must have lower-priced labor. We want to get our money's worth in everything, and he did not see why a farmer could not mix his own fertilizers. All understand what is needed by the plants — nitrogen, potash, and phosphoric acid. Apply nitrate of soda first, then muriate of potash, and finally some form of phosphoric acid; apply separately and harrow. The progress now being made does not lessen the labor much. Products are continually bringing lower prices, while the labor required remains the same. Agricultural industry is depressed all over the country; this is caused by over-production, and also, to a great extent, by the reduction in prices. Our foreign population hawk around produce of inferior quality on our streets; this has a bad effect, reducing the prices of good articles. If the farmer cannot use manufactured fertilizers and make them pay, he must use something else. The speaker uses fertilizers a good deal, being so situated that he cannot get anything else. Each must answer the questions as to what fertilizer he shall use, and whether he shall get them separately and apply them separately, or mix first, or whether he shall get them all mixed.

Another gentleman said all soils are different; he tries to restore the original elements to the soil. He always asks himself how he can best restore the fertility of his soil and bring it back to the original condition.

Joshua C. Stone said he did not believe fertilizers all humbug. He lives near the abattoir and knows that all done there is done openly. It costs them thirty-six dollars a ton to make their fertilizer and they will sell it for thirty-eight. Others might buy what they think best for themselves; he would not give up manufactured fertilizers. You can put manure on one-half of an acre of land and fertilizer on the other, and if the fertilizer does not give better crops the manufacturer will return your money. He called that honest. They also admit that there is no fertilizer equal to barnyard manure. He did not like to see them handled in this way when they were not present.

Kenneth Finlayson told of his experiment with mixing fertilizers. He said farmers have the brains, but not the experience, to mix fertilizers. He uses extensively under glass a fertilizer consisting of Canadian unleached wood ashes, guano, and soot; this gives fine results. In the absence of soot he once used the other two, which acted on one another in such manner as to liberate the ammonia, and as it was a cold night the conditions were such that the ammonia destroyed the leaves of all the roses to which the fertilizer was applied. His point was that the manufacturers of fertilizers would not make such errors.

Mr. Low said that ashes should not be mixed with any manure, as it liberates the ammonia.

Mr. Ware did not like the statement made by one speaker, that market gardeners have no brains. There is no business in which the chance to use the sciences is so marked as in market gardening. He did not see any difficulty in mixing fertilizers; all we need is a barn floor and a shovel. Empty the bags of separate materials, giving the proper percentage of each, and then mix. The expense of mixing is about fifty cents a ton. The ammonia is the most expensive part of fertilizers. Don't accuse us of ignorance, Brother Stone.

Mr. Stone answered that if we saw Mr. Ware's crops we should understand his meaning.

Mr. B. B. Butler said that he understands that it is the nitrogen which starts the leaf growth on plants. Why, then, do we need to mix at all?

Mr. Ware replied that the mixing was merely a saving of the labor of putting it on. You can put on three handfuls at a time just as easily as one.

Mr. Butler asked how much does going over three times amount to?

Mr. Ware said we put nitrate of soda on for the leaf growth, and the rest to get the crop, so that we should apply the nitrate of soda when the crop needs it. Phosphoric acid and potash are not needed then. Apply the nitrate in small quantities.

Dr. Crozier said there is one loss in artificial fertilizers which has not been mentioned. If we buy a ton of superphosphate of lime, what do we get? At least fifty per cent of sulphuric acid and water. The acid has united with the larger part of the lime as an insoluble sulphate, and the phosphoric acid is in the form

of a soluble biphosphate of lime, which must be neutralized by the alkalies in the soil in order to be used by the plants. When South Carolina rock is used in making the superphosphate, much of it reverts and becomes permanently insoluble. Phosphoric acid is almost the only constituent of modern fertilizers which admits of a reduction in cost, as nitrate of soda and the various forms of potash are probably as cheap now as they will ever be. Minutely divided bone dust will be found to be the most satisfactory form in which to use phosphoric acid, as a large proportion is available for present use, and the residue is rapidly brought into condition for future crops.

A mixture of half a ton of cotton-seed meal (a cheap and continuous source of nitrogen), six hundred pounds of nitrate of soda, half a ton of high-grade sulphate of potash, and one ton of pure bone flour will meet the requirements in most cases.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 27, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE in the chair.

The following paper was read by the author:

GOOD FOOD FROM THE GARDEN.

By Miss ANNA BARROWS, Managing Editor "American Kitchen Magazine," Boston.

Since the Massachusetts Horticultural Society has asked a woman to address this meeting, presumably it wishes to look at the interests which it represents through the eyes of the housekeeper. This is a hopeful sign, and indicates that in the near future producer and consumer may coöperate to secure the best interests of both parties. Today they seem to be separated by a multitude of middlemen, who, perhaps from ignorance of the best methods of handling garden produce, often injure rather than help this branch of trade.

The gardener, the marketman, and the housekeeper should have frequent conferences, to the end that all people should be better fed; that the human body may repel disease and temptation to crime, and may be able to bear the heavy burdens of the twentieth century. Let us look at the possibilities of obtaining good food

from the garden in the past and at the present time, and then consider what may be done to improve the supply of such products and increase their use in the future.

The successive stages by which our present methods of feeding ourselves have been evolved from the customs of primitive man form an interesting study, which is of especial value to those whose business it is to provide food for mankind. The earliest foods of races in warm climates were fruits and nuts, of which nature furnished an abundance, and which were eatable with little or no preparation. In some cases the women and children ate the natural fruit, while the warriors fed on dried fruit prepared with oil. Others subsisted mainly on raw flesh, and, perhaps by accident, discovered that new and agreeable flavors were developed by heat. Broiling or roasting over the open fire has been with all races one of the first steps in the art of cookery, and meats rather than vegetables were the objects of early experiments in this direction.

> "To cookery we owe well-ordered states
> Assembling men in dear society."

Savages found it a simpler matter to pursue their food rather than to take the chances of producing it from a fixed place. The placing of a hearthstone and the planting of seeds were higher steps on the ladder of civilization. For a nomadic life a larger area of country was required than is sufficient to support a given population by other means. Even grazing, which succeeded the chase as a method of supplying food, will not support a large population on a given average.

This is one of the strongest arguments that vegetarians can bring in support of their cause. As the world grows more populous fruits and vegetables must supply the larger portion of the food of its inhabitants. Not until men became versed in the art of agriculture was it possible to make further advance in cookery, since the products of the vegetable kingdom required greater development before they offered much inducement for the experiments of the cook. Nor do the most skilful efforts of the farmer avail unless the cook handles his products with equal intelligence.

Count Rumford once said, "The number of inhabitants that can be supported in a country depends as much upon the art of cookery as upon that of agriculture: both arts belong to civilization; savages understand neither of them."

Progress in both these arts is shown by the very general interest in cookery displayed by various agricultural organizations. They are recognizing that the quality of food product is not assured when it leaves the hands of the farmer, and that quite as much depends upon its preparation for the table as upon its cultivation.

Among the topics discussed recently by the grangers have been such as "The Garden of the Farmer *versus* the Pork Barrel." Another worth considering would be "The Home Garden *versus* Patent Medicine."

A census of New England today would fail to show a very general knowledge of the almost infinite variety of vegetables which might be cultivated within its borders.

It has been said that vegetables, to the early settlers of New England, meant only potatoes and beans and corn, with a boiled dinner now and then. That was a slight advance upon the habits of the Indians, but to their instruction we are indebted for much of our knowledge of corn and beans.

This ignorance of valuable foods is the result of habit and the inertia which makes it hard to enter new paths. The reason often given is that people generally do not like vegetables; perhaps it would be nearer the truth to say that we do not know how to cook them so that they will be palatable.

Not only have we failed to learn how to use new vegetables, but have nearly lost the art of making some of the standard dishes of the past. The increased facilities for obtaining meat from the West, and the cheapness of canned foods packed in California and the South, have rendered it unnecessary for us to exercise our ingenuity to prepare a variety of palatable dishes from the scanty store of products available to our ancestors. From the corn they prepared hasty pudding, hulled corn, brown bread, boiled and baked puddings, and succotash with the bean, which also furnished the bean porridge and filled the bean-pot, to be baked till tender and savory. Sauerkraut found a foothold in some sections of New England with early German settlers and remains until this day, and pickles of all sorts and kinds have always flourished. As a whole New Englanders have not taken kindly to soups and salads, and have yet to learn the possibilities of vegetables in these directions.

The early New England housekeepers achieved wonders with

flour, the most refined food product at their command, but they did not try many experiments with vegetables; possibly because the men were too busy in subduing the new land to provide very satisfying gardens. Then as now the cook books gave comparatively little space to directions for the preparation of vegetable foods.

The criticism usually made upon the present food of the American people by those familiar with dietary standards and the customs of other countries is that we eat far too much meat. By a comparison of the foods of different nations and classes of society we should see that meat eating is not essential to strength. and that the very poor depend upon vegetable food because it is cheap. On the other hand many of the wealthy find in the expensive varieties of fruit and vegetables, like the mushroom. the globe artichoke, and the products of the hothouse, an opportunity to spend money lavishly and to gratify their æsthetic tastes.

For the majority of our people today vegetarianism is hardly practicable, but its adherents increase rather than decrease. While in many instances vegetable substances furnish more nutriment in proportion to the cost, they are less quickly digested and less completely assimilated than animal tissues. Now we are obliged to employ the animals as middlemen to transform the tough grasses into substances which can be digested by us. As our scientific knowledge increases, doubtless we shall find ways to prepare as food many substances now worthless.

Though the people of this age continue to be meat eaters, the quantity now consumed because of the abundance of meat in this country is far too large. The average diet would be improved by a greater use of vegetables. Animal food should not constitute more than one-fourth of the whole amount eaten.

There are objections to an exclusively vegetable diet, and no radical change should be made; but equal objections may be brought against the use of meat. Probably a larger bulk of vegetable food would be required to produce similar results, and the vital processes would move more slowly. On the other hand. some of our most troublesome diseases, like intemperance, cancer. and gout, are thought to have a direct connection with excessive meat eating.

B. W. Richardson has said: "Keep as near as ever you can to the first sources of supply, fruits and vegetables."

Allowing for occasional idiosyncrasies, people can eat anything, and habits in this direction are easily formed. We learn to like olives and mushrooms because the taste for them is a proper one; in the same way we may enjoy a variety of vegetables.

At the present day we are beginning to realize that a knowledge of the composition of each food is essential to its wise selection and preparation. Vegetables and fruits afford all the five necessary food principles, but the proportions are hardly satisfactory for a perfect diet. Fats and proteids need reënforcement, and this is accomplished by the use of butter, oil, eggs, and meats.

To generalize in describing the foods which come from our gardens, they contain water, starch, sugar, gum, pectin, fats, proteids, and mineral matters. The great amount of water — from seventy-five to ninety-five per cent — serves to supply in pleasant form our most essential food. The lack of water in the average diet has been called our "gravest dietetic error."

The carbohydrates — starch, sugar, and the like — are the most important solids in vegetables. The potato contains more starch than any other moist vegetable, and according to late government experiments this is more easily digested than many other starches. Sugar is too often lost by throwing away the water in which vegetables are cooked. Dextrin and dextrose are formed from starch in the maturing of fruits, and probably in some processes of cooking vegetables. Pectin, pectose, and gum are substances as yet little understood. Fats in our ordinary garden vegetables are in too minute quantities to be reckoned. The proteids are complex substances and are most prominent in the pulse family. They are less digestible than animal proteids; even a third may pass through the system undigested.

The mineral matters are valuable forms of phosphates, iron, and potash, in keeping the blood pure.

It is interesting to note the different parts of plants which are used for food — the roots, stems, leaves, and seeds. The latter are used mainly in the dry form, and absorb much water in preparation. This must be remembered when studying analyses of dried legumes and cereals.

The cellular structure of vegetables, which constitutes nearly half their bulk, is the chief barrier to their use and the great obstacle to be overcome by cookery. This material is closely

allied to starch and is variously subdivided as cellulose, woody fibre, and lignin. These cell-walls cannot be wholly separated from the nutritive substances which they contain. In moderate quantities cellulose may aid the process of digestion by giving the necessary bulk for the stomach to work upon, and thus afford a wholesome stimulus to intestinal contraction. The denser forms of woody fibre cannot be digested, and moreover hinder the process in other substances associated with it.

Plants growing rapidly with plenty of water and sunshine usually have less of this woody fibre, and it is the aim of the gardener to eliminate it as far as possible. The cook tries by higher temperature to soften this substance, and if boiling water could be raised to a point above 212° Fahr. it would be desirable.

By improved methods of cultivation the agriculturist has removed the acid flavors of the natural vegetables and has reduced the proportion of woody fibre, but he undoes much of his work by careless methods of delivery to the consumer.

Between the farmer and the marketman certain trade customs have grown up which are calculated to foster ignorance on the part of the consumer and against which the protests of intelligent housewives avail little. A large part of the vegetables displayed in our markets are overgrown, wilted, or carelessly prepared. Those which suffer most from this treatment are radishes, cucumbers, green peas, beans, corn, and summer squashes.

The public must be educated to appreciate quality rather than size; to recognize the facts that wilted southern vegetables never equal "natives" in flavor, and that gain in size usually means a corresponding loss of flavor.

Why should we have to lose the sweet nutty root of the celery because it is pierced with a nail? Why need asparagus waste its strength in producing several inches of stalk which must be thrown away? Why should not summer squashes and cucumbers be sold by weight as well as winter squashes?

The arithmetic of the market gardener is mysterious to the housekeeper — sometimes onions are sold by the pound; sometimes by the quart. Bunches may be three or four or eight or any number that suits the dealer's fancy. Marketmen say that women are becoming more interested in all these things, and a simplification of methods of sale would increase this interest.

The public is not wholly to blame for its ignorance in these

directions. The gardeners often grow different varieties for their own table from those they offer for sale, and the greengrocers apparently know no difference in qualities of different species of vegetable. One market handbook devotes fifty pages to describing meats and fish, while but ten pages are given to vegetables and fruits.

Easy transportation and culture under glass have served to take away our appetite, since when we can have anything at any time we do not care for it at all.

The forcing of vegetables out of season has confused the housekeeper unfamiliar with farm life. She does not know when anything is at its best and does not take advantage of an abundant market, but supplies herself with canned vegetables, which are always in season.

There should be a strong movement against the use of foreign substances in canned and dried vegetables and fruits. Salicylic acid, coloring matters, and sulphur may or may not have ill effects, but they surely cannot improve the quality or flavor of first-rate vegetables.

Dried fruit and vegetables would be more popular if specific directions had been given for their use. Few persons realize that long soaking and little cooking produce the best results. Perhaps all this instruction will have to be given by some enterprising seedsman, just as the food-product people show how to cook their wares.

The housekeeper knows little of the comparative merits of the vegetables in the market, and often is no wiser than the New Jersey family recently reported by the United States Department of Agriculture, where 14.8 per cent of the whole sum spent for food went for oranges and celery, which furnished but 1.4 per cent of the total full value.

To quote Count Rumford again: "I constantly found that the richness or quality of a soup depended more upon the proper choice of the ingredients and a proper management of the fire in the combination of these ingredients than upon the quantity of solid nutritious matter employed; much more upon the art and skill of the cook than upon the sums laid out in the market."

The methods of cookery applied to vegetables are similar to those used for meat, but must be adapted to the composition and condition of the individual specimen.

There is usually some one way best for each vegetable, but where one kind only is available it is necessary to serve it in a variety of ways. This perhaps explains why the average cook book gives more receipts for the potato than for all other vegetables. Almost any vegetable may appear by due combination with milk, butter, and eggs in soups, fritters, croquettes, souffles, or salads. Suitable utensils are essential; vegetables should not be cooked in iron kettles when any others are attainable; strainers, ricers, and presses are desirable.

Strong flavors frequently are due to careless preparation. Careful trimming and thorough washing are essential. Wilted vegetables are improved by soaking. Salad plants need especial care in washing to remove parasites as well as hellebore or Paris green.

By cutting in small portions the time of cooking may be hastened. In general, vegetables are to be put in soft water, freshly boiling, and kept at the boiling point until tender. If uncovered the color is better preserved and the odors are less pronounced. Salt should be added when the cooking is partly completed. Soda may be used legitimately in minute quantities to aid in softening the water.

As a rule, with all sweet, well-flavored vegetables the water should be allowed to evaporate at the end, instead of draining it off. By that means all the valuable qualities are preserved.

In one of the publications of the United States Department of Agriculture the difference in digestion of the same food cooked in various ways is thus stated: Whole peas soaked and cooked, 60 per cent digested; peas cooked a long time and strained, 82.5 per cent; pea flour cooked with milk, butter, and eggs, 92 per cent. This would seem to prove that the portion of vegetable food considered undigestible can be reduced by right methods of cooking. Why should not a meal or flour of peas and beans be obtainable in our general markets?

It is impossible to give the exact time for cooking any variety of vegetables, for every sample will differ. They are unpalatable when underdone and also at the other extreme.

Contrary to the usual impression vegetables may be warmed over if care is taken in the process.

But it is to the home garden that we must look for the real luxuries in the vegetable line — where they can be tended and

petted individually and gathered as required, each at its own perfection.

The best land is none too good for a garden. It should be near the house, where each member of the family can spend the odd minutes giving cultivation to the plants, and in turn receiving fresh air. More outdoor work for women would add immensely to the comfort of the family. The garden should be planted to fit the family as carefully as a library should be selected. Many a professional man, living in city suburbs, would save doctors' bills as well as grocers' bills by cultivation of a garden.

Can we wonder that it is impossible to work the city poor out into the country when all education is away from Mother Earth? Had Mayor Pingree started the potato gardens a generation ago matters might stand differently today. Some foreign countries have found it wise to teach horticulture in their public schools. It is not strange that country boys and girls come to the city, since they are not shown the interesting phases of country life. Why do not the horticultural societies offer generous premiums for the best lot of vegetables raised by boys and girls?

What has the future for us in the supply of garden products? More progress than has been made in the past. By irrigation, electricity, and new devices, methods of agriculture will reach greater perfection. New districts in New England even may become as famous for some specialties as Kalamazoo for its celery, Boston for lettuce, and Essex County for onions.

New England is becoming a resort for summer travellers, and change of food is as necessary as change of air. Let the boarding houses refrain from imitating the city hotels, and make a specialty of fresh fruits and vegetables raised in the immediate vicinity, and the better class of company will appreciate their efforts.

Professor Goodale said awhile ago that as yet hardly one per cent of the plants known to exist are used as food. When we think of the unpromising condition of the natural potato and celery, here is an attractive field for experiment. Moreover, we have not quite succeeded in supplying all the needs of our own people when we import Scotch potatoes, Danish cabbages, and Hungarian beans.

The medicinal qualities of vegetables are known but little — they vary according to the soil and method of cooking and serving. A

tithe of the money now expended on patent medicines, spent in experiments would determine these qualities. Celery, some physicians say, has an undeserved reputation for relieving rheumatism; lettuce is supposed to quiet the nerves; spinach the French call the broom of the stomach; but who knows whether these claims are valid?

It has been worth while to study fermentation thoroughly because an immense amount of capital is invested in breweries. Cattle foods are investigated because they are a large expense to the farmers. Might not equal profit accrue from a thorough study of changes which take place in vegetable foods between the garden and the table?

So far as the nutritive value of the food is concerned, all efforts of horticulturists are useless unless these products are treated properly in the kitchen.

One of our New England agricultural reports recently contained many photographs showing the effect of different fertilizing agents on common crops. Why should not our agricultural experiment stations study different methods of cooking these foods, and tell us when and how to use soda and acids to soften the tough fibres of vegetables; when cold water is best and the effect of different degrees of temperature; how to treat the same vegetable at different stages of its growth; whether anything is gained from the action of diastase by soaking seeds before cooking; and a thousand other questions which perplex the cooks?

You may say these are questions for the cook to settle, but the farmer has an agricultural experiment station in each State with skilled chemists and biologists, and all the apparatus needed for such experiments. Why should they not do a little for the cook? The government holds schools and institutes for the teacher and for the farmer, why not for the housekeeper? Why is there not a chair of domestic science in all our New England agricultural colleges as well as in the West? Why should not the fairs offer premiums for cooked vegetables, or give lessons in this branch of cookery?

"The present need in this country is not so much of instruction how to earn as how to spend an income, especially a small one."[1]

[1] Edward Atkinson.

Discussion.

A lady asked, Did you say that no member of the cabbage family is poisonous? If so, how about the skunk cabbage?

Miss Barrows answered that that plant is not botanically related to the cabbage of our gardens, but belongs to the Arum family, and is closely related to the Jack-in-the-Pulpit.

In answer to another lady, who inquired about books, Miss Barrows said there are several that are helpful, but we need more. W. Mattieu's "Chemistry of Cookery" and Yeo's "Food in Health and Disease," which was quoted this morning, are among the best. She was convinced that writers on cookery do not know as much about vegetables as about meats. She would discourage the use of canned vegetables when fresh ones can be procured. There are all kinds and conditions of onions in the market. There is, as a result, a great difference in the time required for cooking and in the flavor; she advised changing the water occasionally. In reply to an inquiry whether young milkweeds are good for greens she said that they are, as also purslane and mustard.

President Appleton said he thought this was a field for ladies to work upon, and he would like to see a list of the plants which might be used. We want more definite knowledge of the changes undergone in vegetable substances in cooking.

Miss Barrows said asparagus beds are few and far between in farming communities. Swiss chard is seen occasionally in Boston markets.

Benjamin W. Putnam had grown Swiss chard in his garden; it will suit those who argue that we should eat only what grows above ground. A single plant will furnish enough for a family. It is our business as market gardeners to furnish what the public want. Prizetaker onions are said to weigh three or four pounds each.

Miss Barrows replied that the onions raised here are generally reputed coarse, and stronger than those from milder climates. Our cooks want an onion that will cook quickly.

Vice-President Ware thought the Danvers onion the most productive and having the best keeping qualities, but that it is not a desirable table onion. If one wishes to grow onions in a garden for his own use he should raise the Cracker onion.

Mrs. Lincoln asked why we should have nails in celery?

A celery grower stated that all that have gone from his place lately have been tied with matting instead of being nailed.

President Appleton said we want to do all we can to raise the standard of quality. We want to keep out the Bermuda onion by raising as good ones here.

Vice-President Ware wanted to emphasize the importance of the home garden. He undertook to say that if they do justice to the garden, the farmer and market gardener can supply better food for their families than any one else. For sweet corn and green peas, do not rely on one planting; plant every ten days. It is your duty to provide for your families.

Miss Barrows said the discussion on onions had brought out the point she made, that market gardeners do not raise the finest kinds.

Miss Bedford, of New York, was quoted as having a lecture on the neglected vegetables.

A gentleman mentioned using hogbrake, leaves of dog-tooth violets, and *Clintonia borealis*. Another said that more Egyptian onions are brought here than Bermudas, etc.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 13, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President CHARLES H. B. BRECK in the chair.

The following paper was read by the author:

HORTICULTURE IN CANADA.

By Professor WILLIAM SAUNDERS, LL.D., Director of the Dominion Experimental Farm, Ottawa, Canada.

The subject which I have the privilege of bringing before you on this occasion is that of Horticulture in Canada, and in the discussion of this topic it is my purpose to treat of horticulture in its widest sense, as embracing the art and science of the cultivation of trees, shrubs, and plants for both utilitarian and decorative

purposes. This subject covers so wide a field that the brief period of an hour will admit of touching on but a few of its more important features, and, with the view of presenting these in a clear and intelligent manner, I shall first give you a very short sketch of the country whose horticultural progress I am expected to outline.

The Dominion of Canada consists of seven provinces, four provisional territories, and a vast area to the north, much of which is yet unexplored. If the traveller through this country takes the train at its eastern boundary, at Halifax on the broad Atlantic, he may ride with one change of cars through to the shores of the Pacific, covering a distance of three thousand six hundred and sixty-two miles, and all within the settled area of Canada. The three most easterly provinces form a group partly surrounded and more or less intersected by the ocean, known as the Maritime Provinces. Following these come the goodly provinces of Quebec and Ontario, the latter stretching westward along the margins of the Great Lakes — Ontario, Erie, Huron, and Superior — until its western boundary is found beyond the Lake of the Woods. Here Ontario joins the "prairie province" of Manitoba, west of which lie the four gigantic provisional territories, — Assiniboia, Saskatchewan, Alberta, and Athabasca, — comprising vast plains. In a part of the territories a wide belt of the country, lying north of the 49th parallel, — which forms the boundary line between the United States and Canada, — has a dry climate, caused by the hot winds which blow northward from the great American desert. But beyond the spent force of these hot currents, beginning from one hundred and twenty-five to one hundred and seventy-five miles north of the boundary, we find immense partly wooded areas, watered by streams flowing northward, with a soil wonderfully rich and fertile and with conditions favorable for mixed farming, especially for the raising of cattle and for dairying. Still further west stands British Columbia with its sea of mountains enclosing an area abounding in minerals, coal, and lumber. Its waters teem with fish, and some of the fertile valleys are being fast converted into smiling fields of grain and prolific orchards.

Let us touch briefly on the conditions found in each of the divisions of this your neighboring country, and note the indications of horticultural progress. Prince Edward Island, the

smallest of the provinces of Canada, has an area of two thousand one hundred and thirty-three square miles, is one hundred and fifty miles long and varies from nine to thirty miles in width, and has a population of one hundred and ten thousand. This island has a fertile soil; the climate is cool and bracing in summer, but rather severe in winter. Many varieties of apples, plums, and cherries succeed well there, and gooseberries, currants, and other small fruits are produced in abundance; but the winter season is too severe to admit of growing the more tender fruits successfully. The cultivation of flowers is very general, especially in the cities and towns, in which many avenues of stately trees are found, most of which are European. So also are the shrubs which decorate the grounds about rural and city homes. The number of varieties of trees grown are few, and in shrubs one notices the absence of many beautiful forms which are grown very successfully in other provinces, and which will, no doubt, when introduced, do well here. Horticulture is encouraged by the holding of exhibitions of fruits and flowers in the capital at Charlottetown and elsewhere, which are assisted by grants from the provincial treasury. There is a fine park in Charlottetown, comprising about one hundred and fifty acres, with beautiful drives through the wooded areas and along the seashore, — a cool and delightful place of resort for the citizens throughout the summer months.

Across the Northumberland Straits from Charlottetown, some thirty miles distant, lies the Province of Nova Scotia, with its twenty thousand five hundred and fifty square miles of area and a population of four hundred and fifty-one thousand. The climate of the eastern part of this province is mild and well adapted for the growing of many varieties of fruit of high quality and in great perfection. The Annapolis valley, so well known as the scene of Longfellow's beautiful and tragic poem, is specially adapted by climate and situation for fruit growing, and is rapidly being converted into a vast orchard where the choicest sorts of apples, pears, plums, and cherries grow in the greatest abundance. In this valley there is a special school of horticulture, receiving a liberal provincial grant, where practical training is given to students in the propagation and growth of fruits, ornamental shrubs, trees, and flowers. To drive among the beautiful scenes in that charming valley, when the trees are

covered with blossoms in the spring, or when their branches are pendant with golden fruit in the autumn, is a delight not soon to be forgotten. There are many other localities in Nova Scotia where fruit culture is carried on very successfully, and the exports of fruit from this province are large and constantly increasing. The Fruit Growers' Association of Nova Scotia, which is also aided by provincial funds, is a strong and active organization, holding meetings at intervals during the year for the discussion of subjects relating to fruit growing and other branches of horticulture, and the information brought out is published in the proceedings of the Association. During the past year the quantity of apples exported was about five hundred thousand barrels. Some of this fruit, I am told, finds its way to Boston, where the high-flavored Gravensteins are said to be much appreciated; but much the larger portion finds a ready market in the larger cities in Great Britain. In Halifax there are several parks, including in all about two hundred and eighty acres. The Public Gardens, containing about sixteen acres, are also very attractive and contain some excellent specimens of trees, mostly European, and many varieties of shrubs and conifers, including some choice specimens of Japanese Retinosporas, notably of *Chamæcyparis plumosa* and *C. plumosa aurea.* The Scotch heather, *Calluna vulgaris,* also luxuriates here, and some of the fine flower beds are margined with this pretty plant, which has become naturalized and is growing in large patches in the public parks. Truro and other smaller cities and towns west of Halifax are emulating the capital in the establishment of parks, adorning their streets with avenues of trees, and embellishing their homes with groups of choice shrubs and beds of flowers.

In New Brunswick, with an area of twenty-eight thousand square miles and a population of three hundred and twenty-one thousand, the climate is not so favorable for general progress in horticulture as in the sister province of Nova Scotia. While orchards have been successfully established in the valley of the St. John river, the varieties of fruit grown are chiefly of the hardier sorts, and the cultivation of large fruits is not general. Small fruits, however, are grown in abundance, and the cool weather in early summer retards the ripening season and permits of the growing of large quantities of luscious strawberries, which,

ripening after the main supplies in the New England States, find a ready market in Boston and other cities, with but little competition and at good prices.

Recently a public park comprising two hundred and forty acres has been established at the city of St. John, occupying a commanding position overlooking the turbulent waters of the Bay of Fundy. Through this park roads are being laid out amidst charming and, in some places, rugged scenery. This must in time become a most attractive place of resort.

The Province of Quebec, with an area of two hundred and twenty-seven thousand square miles and a population of about one and one-half million, is also making progress in horticulture. In the valley of the St. Lawrence there are many fine orchards, and nowhere does the celebrated Fameuse apple reach so high a degree of perfection as on the Island of Montreal, where many varieties of pears also, and plums of fine flavor, thrive well. In the eastern townships, on the south side of the river St. Lawrence, fruit growing is carried on to a considerable extent and quantities of apples from this territory find their way to Montreal or are shipped to foreign markets; but on the interior lands, on the north side of the river, only the hardier fruits succeed, and the orchards are few and small. In Montreal and other cities and towns in this province, much taste is displayed in the laying out of the public parks and squares, and in the ornamentation of the grounds of the more wealthy members of the community. Horticultural societies and a Provincial Fruit Growers' Association have been organized, which are aided by provincial funds; annual exhibitions are held, and thus the love for the cultivation of fruits and flowers is fostered.

Ontario is the banner province of the Dominion, and its wonderful variety of climate and rich horticultural possibilities are as yet but partially known. With the noble area of two hundred and twenty thousand square miles, and a population of two million one hundred and fifteen thousand, this province has twelve and a half million acres of cleared land, about three hundred and twenty thousand acres of which are under orchard, garden, and vineyard. The number of apple trees of bearing age in this province is about six millions, while there are three and a half millions more of younger trees, most of which will soon be in bearing condition. The yield of apples in 1896 was

very large, and is estimated at fifty-six million bushels. In the Niagara peninsula, and along the shores of the western part of Lake Erie, peaches are grown very successfully, and there are said to be over half a million of peach trees planted in that part of Canada. Grapes, also, are grown in immense quantities. There are about three million of bearing grape vines in Ontario, producing annually about fifteen million pounds of grapes. There are also large orchards of pears, plums, and cherries, so that Canadian markets are well supplied with home-grown fruits of excellent quality throughout the season, and a large quantity of apples is exported to Great Britain. During the past year more than two million barrels were exported from Montreal. Ontario also sends large supplies of fruit to the prairie districts in the west. A thriving organization, known as the Fruit Growers' Association of Ontario, has been in existence for the past twenty-eight years, and has done much to stimulate fruit growing throughout the province, and also to cultivate a taste for ornamental trees, shrubs, and flowers. This Association receives a liberal annual grant from the provincial funds. The large display of fruit and flowers at the leading annual exhibitions helps to draw further attention to these interesting and important subjects. The Ontario government also gives annual grants towards the support of horticultural societies, which are established in most of the towns and cities of the province. Under this stimulus, frequent floral exhibitions have been held, and the people have been led to vie with each other in beautifying their homes by the planting of trees and flowers. Many large floral establishments are well supported by lovers of flowers. In the cities and larger towns public parks have been established, valuable not only as health resorts, but as repositories for some of nature's choicest arboreal gifts.[1] Horticulture also forms an important part in the curriculum of the Ontario College of Agriculture, which is located at Guelph.

Adjoining Ontario at its western extremity is the Province of Manitoba, with sixty-four thousand square miles of territory and a population of one hundred and fifty-two thousand. Here the climatic conditions are too severe to admit of the rapid extension

[1] The lecture was illustrated with lantern slides, showing scenes in the public parks and gardens in the different cities in the Dominion; also views of many beautiful individual specimens of ornamental trees and shrubs grown on the experimental farms.

of horticulture. The larger fruits are not successfully grown, but many of the small fruits are produced in abundance. The people are everywhere fond of flowers, and the long days and abundance of sunshine in the summer months give a wealth of bloom to many annuals and hardy perennials unknown in eastern climates.

Westward of Manitoba lie the four organized territories of the Canadian Northwest — Assiniboia, with an area of eighty-eight thousand square miles; Saskatchewan, one hundred and one thousand; Alberta, one hundred and five thousand; and Athabasca, one hundred and three thousand. These great divisions extend from the western boundary of Manitoba to the Rocky Mountains, are partly traversed by railways, which have opened up the country for settlement, and a sparse population of from fifty thousand to sixty thousand people is scattered here and there throughout this very large area. The love of trees, shrubs, and flowers is universal on the plains, and luxuriant gardens full of bloom are frequently found among the settlers. In the country to the north lie the unsurveyed and but partly explored districts, occupied only, as yet, by widely distant trading posts and occasional settlers, but mainly in possession of Indians and fur-traders. In this wide expanse are included the districts of Ungava, Keewatin, Franklin, Mackenzie, and Yukon, comprising in all about a million and a half square miles, exclusive of the water areas.

The most westerly province, British Columbia, includes three hundred and eighty-two thousand square miles and has a population of about one hundred and twenty-five thousand. In the busy mining districts not much attention is paid to horticulture, but west of the Coast Range of mountains, where the climate is mild and genial, much like that of England, fruits and flowers grow in profusion. There the holly, laurel, rhododendron, and yew flourish with the apple, pear, plum, and cherry, and, in some localities, the peach. In those parts of the province between the Coast Range and the Rockies there are many fine valleys, some of which have not sufficient rainfall to admit of the successful cultivation either of grain or fruit without irrigation. There are, however, many mountain streams available for this purpose and on some of the ranches very fine apples are grown. The taste for flowers is almost universal, and the long, mild season permits of

many of them being grown in perfection. This province has also a Fruit Growers' Association, assisted by a grant from the public purse, and exhibitions of fruits and flowers are held annually in the larger towns and cities. Vancouver and Victoria have both very fine public parks.

The progress of horticulture, as well as agriculture, throughout Canada has been greatly stimulated by the organization and maintenance of experimental farms by the Dominion Government. Ten years ago this good work was begun, and while the greater attention has been given to measures looking towards the improvement of farming, many lines of horticultural work have been vigorously prosecuted. These experimental farms are five in number, the central or principal farm being located at Ottawa, the seat of government, — where, on the boundary line between Ontario and Quebec, it serves the purposes of these two important provinces, — and the four branch farms in the more distant provinces of the Dominion. A site was chosen for one of these at Nappan, in Nova Scotia, near the dividing line between that Province and New Brunswick, where it ministers to the needs of the three Maritime Provinces. One was located near Brandon, in the central part of Manitoba. A third was placed at Indian Head, a small town on the Canadian Pacific Railway, in Assiniboia, one of the Northwest Territories; and the fourth at Agassiz, in the coast climate of British Columbia. The climatic conditions prevailing at these several points are all very different, and each location in this respect fairly represents a large area.

At each of these farms, orchards and fruit plantations have been established and a large number of varieties of fruits tested, while similar experimental work has been carried on with many different sorts of ornamental trees, shrubs, and flowers. The selections made in each case have been of such varieties as were thought to be most likely to succeed in the climates in which they were to be tried. In the Maritime Provinces the climate resembles that of many parts of New England, and the branch experimental farm at Nappan occupies a fairly representative position. The climate is milder and more moist than that of Ottawa, and all the varieties of trees and shrubs which succeed at the central farm do quite as well, or better, at Nappan, and many varieties of fruits which thrive in Nova Scotia are not able to endure the more severe winters at Ottawa. At this eastern branch farm

there are now nearly four hundred varieties of large and small fruits under trial and about three hundred varieties of ornamental trees and shrubs, and most of these are making satisfactory growth. Many additions are made to these lists every year. Already these plantations are proving a useful guide to the people in the Maritime Provinces, whether they desire to grow fruit or to beautify their homes by ornamental planting.

Passing now at one bound over a distance of seven hundred and forty-two miles west of Nappan, we find ourselves at Ottawa, the capital. Three miles from the centre of the city lies the central experimental farm, consisting of four hundred and sixty-five acres. Ten years ago this land was liberally sprinkled with stumps and stones, and encumbered with one hundred and forty acres of second-growth timber and forty acres of swamp. This has all been cleared and reclaimed, and brought into a fair condition of cultivation. About three hundred and thirty acres are devoted to agricultural work, thirty-five acres to the testing of fruits and vegetables, twenty-one acres to experiments with forest trees, nine acres to ornamental planting along the margins of the roads and about the buildings, and sixty-five acres to an arboretum and botanic garden.

There is an office building with chemical laboratory below, and overhead a museum of farm products, in which the fruits grown at the several farms make a striking display. Near by are the houses of the chemist, botanist, and horticulturist, about which there are some pretty groups of trees and shrubs.

The conservatory consists of two glass structures, each seventy-five feet long, in one of which there is a fair collection of economic and ornamental plants. In the list of the former will be found tea, coffee, cinnamon, camphor, pepper, cinchona, cocoa and other plants serviceable to man. There are also collections of orchids and cacti, with palms and ferns and many of the commoner house plants. Another house is used, during the early months of the year, for testing the vitality of seed grain for farmers and for general propagating purposes.

The barn with adjacent planting shows that the surroundings of even a barn may be made attractive by a judicious use of trees and shrubs.

Orchards have been planted and are used for testing fruits, and the number of varieties of large fruits under trial here is about

eight hundred, and of small fruits about as many more. Many new varieties have been produced on the farm, by growing large numbers of seedlings of choice sorts and selecting the best, and by cross-fertilization. Comparative tests have also been made of a large number of vegetables.

A useful adjunct to the horticultural department is the apiary, where the busy bees work all the summer day, gathering stores of honey from the flowers of various plants and trees, and in carrying on their regular work render valued assistance in fertilizing the blossoms of fruits.

Some people object to planting trees, fearing they may not live long enough to realize much enjoyment from them.[1] To produce the best results comparatively small specimens should be selected. A young and thrifty tree accommodates itself to change of location much more readily than an older one, and the young tree usually develops its normal form more perfectly.

During the early years of our work collections of bulbs — including lilies, hyacinths, narcissus, and many other sorts — were planted in the autumn; but the ground being open and without shelter, the snow at times was so blown off the ground as to leave it nearly bare and most of the bulbs were killed during the winter. To provide shelter, and collect and retain snow over them, an enclosure hedged with arbor vitæ and Norway spruce was planned and the bulbs planted within it; since then nearly all have wintered well. During the winter the enclosure and its surroundings are protected by snow, which gathers within and about it to a considerable depth. The evergreen margin is now about three and a half feet high, and portions of it are almost covered with snow during the colder part of the season.

The beds outside this enclosure afford different aspects, which make them very suitable for certain classes of plants.

Within, a constant succession of bloom during the summer is maintained: hyacinths, tulips, and other bulbs in the spring, and later fine masses of lilies, herbaceous peonies, and irises are grown.

The lilacs, when in bloom in the spring, are among the most beautiful of shrubs, and what delightful improvements have of late been made in this old-fashioned favorite! More than sixty

[1] Views were shown to demonstrate the development in growth and beauty which can be made in a brief period of seven or eight years.

varieties are under test at Ottawa, and nearly all are doing well. Charles the Tenth is one of the best; it is very rich in color. a wonderfully free bloomer, and the clusters of flowers are large. Alba grandiflora is also a good variety; its large white flower clusters contrasting with the rich deep green foliage make it very attractive.

A group of Scotch Pines, *Pinus sylvestris*, is a prominent feature in one part of the grounds; this was planted eight years ago. The trees were then eighteen inches high; now they measure from thirteen to fourteen feet. The rich green color of this species, which is well preserved throughout the winter, makes this tree an attractive object at all seasons of the year.

The Rocky Mountain Blue Spruce, *Picea pungens*, is one of the most valuable introductions of late years, and ranks among the most beautiful of hardy evergreens. The foliage in some specimens assumes a rich shade of steely blue, most striking in the early part of the summer. Many of these trees have been planted in different exposures on the central farm, during the past seven years, and all have proved perfectly hardy.

The European Mountain Ash, or Rowan Tree, *Pyrus Aucuparia*, is a fine object on the lawn when well-grown and clothed with branches to near the ground. Its beautiful foliage and abundant clusters of white blossoms in the spring, succeeded by bunches of scarlet berries in the autumn, make it attractive all through the season.

The Katsura Tree, *Cercidiphyllum Japonicum*, from northern Japan, is an interesting tree, which is quite hardy at Ottawa. The unique character of its foliage as well as its handsome form render it most desirable.

The Sweet Chestnut, *Castanea sativa* var. *Americana*, is a native of the western part of Ontario and is grown with some difficulty in the climate of Ottawa. After several failures, two or three trees have now become established and are doing well. One of these blossomed last spring.

The variegated Dogwood, *Cornus mas* var. *variegata*, is one of the most beautiful shrubs at all seasons of the year. The foliage is richly variegated with white and the variegation is well maintained throughout the season.

When speaking of the divisions made of the land at the central farm and the purposes to which the several portions

were devoted, I stated that sixty-five acres had been set aside for an arboretum and botanic garden devoted to the testing of trees, shrubs, and plants from all parts of the world. Work was begun in this branch six years ago, and already nearly two thousand species and varieties of trees and shrubs, and about one thousand of herbaceous perennials, have been brought together from all the northern sections of the globe and are being tested as to their suitability for the climate of Ottawa. Canada was for a long time the only important British colony without a botanic garden. This stigma has now been removed, and it is hoped that this institution at the farm will soon reach that stage of advancement which will make it a credit to the country.

Permit me to direct your attention for a short time to a few of the individual specimens on this part of the grounds:

The European Larch, *Larix Europea*, is a very handsome tree, valuable for its timber. It is a rapid grower and has a most graceful drooping habit.

The Golden Arbor Vitæ is a beautiful form of the common Arbor Vitæ, *Thuya occidentalis*, in which the foliage assumes a golden yellow hue. This is a brilliant object for a lawn and makes a beautiful hedge.

The Pyramidal Arbor Vitæ is another interesting form of the same species, quite pillar-like in its growth.

The Austrian Pine, *Pinus Austriaca*, is a stately evergreen, of fine form and habit, very hardy, and a fairly vigorous grower. A tree in the Arboretum which when planted six years ago was eighteen inches high now stands about seven feet.

The Norway or Red Pine, *Pinus resinosa*, has also a stately habit, but is of softer outline than the Austrian Pine and makes a handsome tree.

The Mountain Pine, *Pinus Montana*, is a very desirable object for a lawn. Its low-growing, bushy habit, with branches close to the ground, makes it well adapted for localities where space is limited.

The Tartarian or Bush Honeysuckle is a free-flowering shrub and one of the earliest to bloom in the spring, and when covered with its pink or white flowers, or later with its bright-colored berries, is very pretty.

Van Houtte's Spiræa, *Spiræa Van Houttei*, is a lovely shrub, which, during the latter part of May and early in June, is

literally covered with masses of white bloom. In growth it has a pendulous habit and is very graceful in form.

Spiræa Bumalda is another species of the same genus, which has an upright form. This is also a free bloomer and is very attractive.

The Weigelas are very beautiful shrubs which are not entirely hardy at Ottawa, the new wood being usually killed back more or less by the severe weather in winter. In most instances, however, a sufficient quantity of the wood survives to give a considerable amount of bloom. Siebold's Variegated Weigela has proved one of the hardiest forms at the central farm. It blooms abundantly in its season, and its variegated foliage makes it at all times very attractive.

The different species and varieties of Philadelphus (known also as Syringa and Mock Orange) are charming objects for the flower border, and quite hardy. The flowers vary in size from one to two inches across; some of them are single and some double; most of the varieties are richly perfumed.

The Snowball, *Viburnum opulus* var. *sterilis*, is an old-fashioned but most desirable species for the shrubbery. During the blooming season it is literally covered with masses of snow-white bloom. *V. lantana* and *V. dentatum* are also very valuable hardy ornamental shrubs.

The Siberian Cornus, *Cornus alba* var. *Sibirica*, is another very useful and hardy sort. It is a pretty shrub when covered with its flat, white clusters of bloom in June; and when devoid of foliage during the winter, its brilliant red stems form a beautiful contrast with the white background of snow.

The Russian Olive, said to be a hardy form of *Elæagnus hortensis* var. *angustifolia*, is a small tree of very graceful habit, with foliage and branches of a charming silvery hue, which is best brought out where it has a background of dark green growth. This is a very hardy tree and endures the severe climate of the northwest plains well, and when in bloom its numerous small yellow flowers fill the air with their fragance.

Later in the season the Japanese Hydrangea, *Hydrangea paniculata* var. *grandiflora*, becomes a very prominent object in the collection of shrubs, from the large bunches of flowers so freely produced at the ends of the branches. This species has found its way into public favor very rapidly. Only twenty-three

years have passed since this shrub was first introduced from Japan, and during that comparatively brief period its merits have been universally recognized and it has become one of the most widely distributed and favorite shrubs in cultivation.

Populus Berolinensis is a Russian Poplar and one of the hardiest species tested. It endures the climate in all parts of Canada well, making a strong and rapid growth. Many thousand cuttings of this tree have been sent out from the experimental farms to settlers in different parts of the Canadian Northwest. These strike readily and soon form handsome trees, wind-breaks, or hedges. A specimen which was planted in the arboretum at Ottawa six years ago as a small tree now stands over twenty-five feet high.

Many inquiries are made every year as to the best sorts of shrubs or trees to plant for hedges. To gain experience and furnish object lessons, many different sorts are being tested for this purpose. Seventy-five varieties have already been planted as sample hedges, each fifty feet long, and a large proportion of them have had five or six years' growth. These are proving an attractive feature in connection with the ornamental planting at the central farm.

A journey of one thousand four hundred and thirty-seven miles west, by the Canadian Pacific Railway, brings us to the flourishing town of Brandon, in Manitoba, adjoining which is the experimental farm for that province. It is located partly in the valley of the Assiniboine river and partly on the heights above the bluffs which margin the valley. This farm has been greatly improved by the planting of trees, about sixty-five thousand of which have been put out in avenues, shelter belts, clumps, and hedges. Most of the hedges have been planted with quick-growing trees, such as poplars and willows, and enclose good-sized plots of ground. These hedges grow quite tall and act as wind-breaks during the summer and help to collect large banks of snow in the winter, which, on melting, leaves the ground in a very favorable condition of moisture. These plantations have placed examples before the settlers, which many have been induced to follow, and this incentive has produced gratifying results. Tree planting has been further stimulated by free distributions of tree seeds, large quantities of which have been collected, especially of the Box Elder, *Negundo aceroides*, and

the Green Ash, *Fraxinus viridis*. These seeds have been hitherto collected in the river valleys and ravines in the bluffs in Manitoba and the Territories, and during the past seven years more than five tons of such seeds have been distributed free by mail, and during the same period about six thousand packages of young forest trees and cuttings have been sent out in the same way to settlers in that country. Last year the native trees planted on the two western experimental farms produced seed freely, and more than a ton of this has been collected for distribution during the coming season. An arboretum has been started at Brandon, and there are more than one hundred species and varieties of trees and shrubs in it which have proved hardy, and many more are under test. A large number of varieties of flowers have also been tried. Nearly all the annuals do well, and the large amount of sunshine they enjoy there brings many of the species to a higher degree of perfection and results in a greater abundance of bloom than is usually found in the east. In perennials, the hardy list includes Tulips, Herbaceous Peonies, several species of Iris, Hemerocallis, Aquilegia, Aconite, Delphinium, and many others. The love of flowers among the people is very general, and many take great pride in their gardens.

While most of the hardier varieties of small fruits, such as raspberries, currants, and gooseberries, are grown with success, all attempts to grow the larger fruits produced in the east, such as apples, crab apples, pears, plums, and cherries, have failed; the trees do not endure the climate. There is, however, one small wild crab, *Pyrus baccata*, with a fruit about the size of a large cherry, which has been obtained from the northern part of Siberia, that has proved perfectly hardy, having stood four or five winters without showing any sign of winter killing. This bears fruit very freely, and notwithstanding their diminutive size these tiny apples make excellent jelly, and in their present unimproved state would be much appreciated. Efforts are, however, being made to improve this small crab by cross-fertilizing it with many of the hardiest sorts of apples. A large number of these cross-bred seedlings will be ready for planting on the northwest farms in another year. Suitable enclosures are being prepared which will afford the young trees some protection and within two or three years it is expected that some of these will bear fruit. Similar experiments have also been carried on with

Pyrus baccata prunifolia, which has also stood one winter in the northwest without injury, and this fruit is about double the size of that of *P. baccata*. It is probable that some of these cross-bred seedlings will bear fruit of larger size and improved quality, which will be valuable to the settlers there. These trees are both small and low-branched and well adapted to endure the climatic conditions prevailing in the prairie country.

The wild Plum, *Prunus Americana*, is found native in different parts of Manitoba and is common in the valley of the Assiniboine river and in the other river valleys in the southern part of that province. The fruit varies much in size, color, and quality, some trees producing red fruit and others yellow, and while some of the fruit is but slightly astringent and of fair quality, other samples are scarcely edible. Efforts are being made to improve the wild plum by selection from seedlings grown from the best varieties. It is proposed also to follow this up by cross-fertilizing with better sorts.

The Sand Cherry, *Prunus pumila*, is also a native of the far west. It is common about the Lake of the Woods and has been found on the prairies as far west as the 108th meridian, and as far north as Prince Albert, which is about three hundred miles north of the United States boundary. The Sand Cherry is a very variable fruit; the commoner forms are about the size of a large Marrowfat Pea, with a disproportionately large stone and astringent flesh, while occasional bushes are found bearing fruit as large as the English Morello Cherry, with a much larger proportion of pulp to stone and a superior quality of flesh. Fruits subject to such free variations in the wild state may be expected to improve still more, in size and quality, under the influences attending higher cultivation and cross-fertilizing. It is believed that the prospects in connection with the efforts which are being made to improve the fruits referred to are hopeful, and that there will in time be produced such varieties as will prove useful fruits to the people of the northwest country.

A further journey of one hundred and eighty-five miles over the plains brings us to the experimental farm at Indian Head, in Assiniboia, one of the Northwest Territories. This farm is about the same size as that at Brandon, viz., six hundred and eighty acres. When this land was purchased it was a piece of bare prairie, without tree or bush. During the eight years it

has been occupied tree planting on a rather large scale has been carried on, and there are now growing on this farm, in shelter belts, blocks, avenues, wind-breaks, and hedges, more than one hundred thousand trees. Difficulties were encountered at first from the very strong winds, which gave the trees a stunted appearance, but these obstacles were gradually overcome and the trees have now made such a free growth that they protect one another, producing a vast improvement in the appearance of the place, and affording much shelter.

Although the climate is more severe here, the experiences had with fruit trees and with forest and ornamental trees, as well as with flowers, are nearly the same as those which have been gained at Brandon.

A further railway ride of five hundred and fifty miles from Indian Head brings us to the end of the one thousand miles of plains which stretch from the easterly part of Manitoba to the Rocky mountains, and now we find ourselves ascending among the foot-hills, the landscape broken into bluffs and valleys with clumps of wood and park-like openings between them, and after two or three hours more of journeying, Banff, where the Canadian government has established a national park, is reached. It nestles among the mountains, and the efforts to improve this beautiful spot have been mainly in the way of making roads so as to open up the romantic beauties of the place, and render those points which afford the most striking views easily accessible. As we approach this elegant resting place for tourists, we pass the "Three Sisters," a lovely group of mountains; also the Cascade mountain, whose bold rocky summit rises abruptly from near the railroad track more than five thousand feet above the valley. This mountain derives its name from a small cascade which dashes down the mountain side, in which it has worn a distinct channel. Some of the most lovely views to be had anywhere in the mountains are to be seen at Banff, where there is a delightful combination of mountain, water, and forest. A museum has been established here by the government, which contains collections of the mammals, birds, and plants found in the national park.

There are also some beautiful lakes in this neighborhood. Lake Louise is one of the prettiest. The bright green color of its waters contrasts strongly with the pure white of the glaciers beyond, while the many-hued cliffs, with various shades of brown

on the one side and the deep green of the spruce-clad banks on the other, all help to form a most harmonious and striking picture. Near by, but about a thousand feet higher, Lake Agnes bursts upon the view, with wilder and totally different surroundings.

One more stretch of about four hundred and eighty miles, through wonderfully varied mountain and valley scenery, takes us through to the valleys and delta lands of the coast line. Here we have the coast climate, which, on this part of the shore of the Pacific, is cool in summer and mild and moist in winter; but returning eastward towards the interior, it becomes hotter in summer and colder in winter, with less rain.

At Agassiz, seventy miles east of the ocean, the most westerly of the experimental farms is located, in the valley of the Fraser river. Seven years ago this place was a wilderness. Now there are one hundred and thirty acres of land cleared and under cultivation, and about half of it has been planted to fruit, and more than two thousand varieties of fruits are under test there, nearly all of which are doing well. The climate is mild, and suitable for this industry, and nowhere do the plum, apple, cherry, and pear bear fruit in greater profusion. Every variety likely to be of benefit to the country is being tested, so that the fullest information may be available to the settlers as to the best and most profitable varieties to plant.

All sorts of small fruits succeed remarkably well here. A very large number of ornamental trees and shrubs are also successfully grown, including some of the more tender varieties, which are not hardy at Ottawa. Flowers also succeed admirably in this moist climate. The Japanese and other lilies grow luxuriantly, and during the flowering season they fill the air with their fragrance.

I must not trespass further on your time. I have but touched here and there on the almost limitless field covered by my subject. I hope, however, that I have succeeded in showing that horticulture is not entirely neglected in Canada, but that individuals, communities, and governments (both Provincial and Dominion) from one end of the country to the other are striving to help along this good work. While we cannot expect soon to reach that degree of horticultural advancement which we see and admire so much in older and wealthier communities like

your own, we are striving to follow in a measure your noble example and to profit by the generous help which you are always ready to give. Your Arnold Arboretum has aided our experimental farm work in a princely manner, and your ever welcome publications are a constant stimulus towards progress. Although not under quite the same form of government, we are of the same stock as yourselves, and the love for and appreciation of the marvellous beauties of nature brings like pleasure wherever we dwell, whether we acknowledge as our ruler a worthy president or a matchless queen. Horticulture is bounded by no political lines, but in every community where the mind is sufficiently cultured to appreciate the wonderful beauties with which the world is studded, there these lovely trees and shrubs and flowers, which combine so much of grace and beauty, become a perennial source of quiet delight. They are but expressions of the thoughts of the great Creator, who established and sustains the laws which govern their growth and development. Some love for the beautiful in nature is found in almost every breast, and companionship with such charming objects tends to deepen and enlarge that feeling of admiration, to elevate our thoughts and lead them from Nature up to Nature's God. Their beauty is inspiring, and while we study them we catch the spirit and gladly follow the teaching of the great Master in his inimitable Sermon on the Mount, when, gazing on the lovely flowers growing around him, with the deepest insight into the perfection of their beauty, he exhorted his hearers to "Consider the lilies of the field how they grow. . . . I say unto you that even Solomon in all his glory was not arrayed like one of these."

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 20, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

SOILS AND POTTING.

By T. D. HATFIELD, of Wellesley.

The subject which your Committee on Lectures has been kind enough to choose for me is generally considered by gardeners as the most important one they have to deal with. This is true, but we must not narrow the question down to one simply of gardeners' methods, for many of us are farmers as well, cultivating a great variety of plants, and we wish to consider whatever in this connection affects our material welfare.

Gardeners seldom fully agree about the proper soil for any crop. Few of us find ourselves having the same conditions of soil to deal with. Our soil may be heavy or light, the land high or low, and with every variation of exposure. We go from one place to another, and often wonder at our neighbor's success when we should consider failure certain. I have received plants with the soil so stiff that I wondered how they ever dried out when once wet; and from another place where the soil would appear to be about the same as our swamp mud. An acquaintance of mine tells me that at one place where he was gardener, in the neighborhood of Cape Ann, the only bit of potting soil he could find was turf from what had at some time been a salt marsh. After it was broken up, and the air and frost went through it, he found he could grow almost anything, from a geranium up to an azalea. Everybody finds a way of dealing with the problem before him.

Sometimes we find ourselves with a garden lot so springy that nothing can be done in the way of cultivating it until very late in the season, and again with a soil so dry that we must irrigate for all except early crops. A dry soil is easily worked, but more difficult to keep in condition for supporting crops, because it holds sustenance poorly. Frequent manuring is required to keep it in

trim. For general purposes, probably a heavy soil is best. It is easy to make a part of the land light enough for a few early crops. Then a heavy soil holds manures better. By autumn plowing and cultivating the ground in plats, one can bring it into a good friable condition. We all know the value of a retentive soil in summer time. These general remarks have some bearing on what I shall say later.

We gardeners, taken together, are a conservative lot. We believe in "leaving well enough alone." It is a good policy, and one which carries much weight with it, and respect also. There are methods which we continue, often because it is the custom or practice to do so, and often we cannot explain why. Much experience is scratched up in a hand to hand sort of way; we find out as we must, and often we are obliged to experiment for ourselves, for the best practice of one does not always suit the case of the other. The gardeners of the United States have to thank the old-country gardeners, and many of us our old-country training; though much that we do here is done differently, yet an intelligent training helps us better to gauge our practice to the altered conditions, and these are principally of climate. Wrong we may be sometimes, and often too particular, but it is better always to err on the side of prudence.

Take the old books, and we shall read: "One-third of turfy loam, one-third of leaf soil, and a third of sand;" or it may be fourths, including rotted manure, or fifths, with peat added; but accurate measuring is tedious work, and too slow to suit Yankee ideas, so the tendency is toward simpler methods. As a matter of fact there are but few mixtures of soil in use today. Leaf soil, one of the best ingredients in any compost, is seldom used in any except private gardens. Many gardeners manage to get along without it. Well rotted manure is a good substitute, and in some cases is better. It is necessary, however, owing to the prevailing slipshod methods, that the soil should be light for potted plants. The man with a hose can over water with safety when the weather is hot, and the plants soon dry out, and when it is cold artificial heat has the same effect. But you cannot persuade the old-time gardeners to use the hose, though they may see that it really makes little difference, if ordinary care is used. Many plants set down as requiring heavy soil may be grown as well in a light soil. Wherever the rose grower is located, he finds means

of meeting the natural wants of his soil. He may add clay, but will not if he finds he can succeed without it, and he is almost sure to do so.

Take Azaleas. It used to be, and is yet in some places, considered necessary to import English peat in order to be successful with them. Ninety per cent of these beautiful hard-wooded plants are still grown in peaty soil in England. Nothing succeeds like success there as well as here, even though it be arbitration! If an English gardenerg rows good Azaleas in peaty soil he is not likely to change his practice. Ocular demonstration cannot be overcome, and if we will not be convinced by any other argument we must be by this. For instance, take a look at the Azaleas grown by Mr. Charles Sanders, gardener for Professor C. S. Sargent, of Brookline, and you will see that Azaleas can be grown in a soil almost wholly lacking peat.

This brings us to another part of the subject. The successful cultivator of plants finds there are other considerations almost as important as the soil and its consistency. I have tried all kinds of soil for Gloxinias, consulting this and that formula. I potted them in light soil, heavy soil, rich and poor, all to little advantage. With these handsome tuberous-rooted plants much depends on caring for the tubers during what is called the resting season, though they are never absolutely at rest and we make a mistake when we enforce it by removing the tubers from the soil in which they have been growing and storing them in dry sand, as is frequently the practice. They should never become thoroughly dry, for living roots will at all times be found, and these require some nourishment. It is important that we should start with sound, healthy roots, start them slowly by withholding water until some leaf growth is made, and at all times keep them near the light, though not in direct sunlight. If we attend to these essential conditions we shall find that Gloxinias succeed in almost any soil. Peat soil may be necessary for some Ferns, but almost all of them will thrive as well in good loam and leaf soil.

It may surprise you to know that I have but one compost heap, and that is seldom as good as I should like to have it. Good turfy loam is not as plentiful as I could wish, and though it is really the best, some of us have found out how to get along without it. The old country carnation growers are extremely careful when mixing their potting soil — a barrow full of this and that

and so much brick rubbish and charcoal; but the American grower prepares his in the field without a foot of turf; he must and so he does. He has several methods and perhaps the best and most common-sense one is to cultivate the area for stripping, growing thereon a crop of clover with no object beyond turning the best of what is put into the soil as manure into plant food of the kind which the Carnation most needs. The American grower raises more and better Carnations than his English compeer. He has, it is true, many advantages not possessed by the Briton. He has better light during the winter time, he has made a specialty of the work, and more than all, he has originated a new type of Carnations. What I have said about Carnation growing only goes to show that the importance of a prescribed composition of the soil is over-estimated.

I said I had only one compost heap; this is not quite true, for beside it I have a special one for Chrysanthemums. Perhaps I am fussy in this, as I don't think it makes much difference. I am fond of experiments and have made lots of blunders in my time, but I can say this, that two plants potted in the soil from the common pile were just as good as those grown in special soil. The specimen Garza shown at the last exhibition here was one of these.

When I first set out to pile up potting soil I scratched hard for turf. I landed in New Jersey, and those who have lived in the manufacturing districts about New York know how scarce a bit of turf is. I was bound to have it, and so made up a pile of witch grass dug from the road-side. It was not very bad, for witch grass does not grow in poor soil. I was delighted, however, when I came to Massachusetts and the possibilities of a rare compost heap grew in my imagination, but I soon learned that turf here was not as free as water by any means. It is an old saying that "one never knows the worth of a thing until he wants to buy it." I was not to be baffled, however, and in less than a year I had half a dozen piles. I scoured the hollows in the woods for decayed leaf soil, and well remember coming across an old-time charcoal burner's camping ground in a clearing, well covered with turf. I thought I had now found just the right kind of soil for everything; but it proved to be the deadest stuff I ever used. Like a fancy dish it was no good without a dressing — a dressing of manure in this case. I made up my mind to keep my

find a secret and did until another was disappointed in the same way, and then, remembering that "misery loves company," I told how I had been deceived.

On a gentleman's place there is always a good deal of turf trimming to be done in spring time, grass edges to be neatly cut off around the walks, and borders straightened. By taking a generous slice where I dared, I usually managed to get together enough for the season's use. I am less ambitious now; if I get half a dozen cartloads of turf, I mix with it two loads of my best manure — sheep manure when I can get it. That which comes from the Colorado ranches is just right for composting, being three or four times as rich as other manures, and less is required on this account. This I put in layers alternately with pure ground bone. The bone meal and sheep manure will start fermentation, and this chemical action is valuable in more ways than one. Soil heated to 120 degrees Fahrenheit is fatal to all insect life and weed seeds, and further than this experience has shown that this chemical action is necessary to render bone meal available as a plant food. I have seen it used in a green state, but cannot say that I have been pleased with it; the odor is most disagreeable, and the mouldy condition it assumes, which is, no doubt, a necessary stage of its transition from a crude into a soluble plant food, is, to say the least, unpleasant to look upon. Bone meal is slow in becoming available, but lasting when it is; it should be worked into the compost long before it is needed, as it is not fit for use until fermentation has subsided. It should never be applied as a top dressing. Before I knew this I thought it would be a good idea to scatter a layer of bone meal on the bottom of flats I was working up for young Chrysanthemum plants. I intended they should have a good start and was, I suppose, too liberal, for in all my experience I never saw such a sickly looking lot of plants. I examined them every day and tried my best, hoping and believing they would come round. I waited almost too long. Finally I potted them in fresh soil, and when taken out of the bone meal compost I could almost have blown them over; how they managed to exist with so few roots is a mystery.

I said a light soil is best for potted plants, but this is only my experience; where a man must, perchance, get along with a heavy soil, and understands its management thoroughly, he may say as much in its favor. Two or three years ago my employer dug

out a slough; he wanted mud and also a place to dump gravel. This slough was found to be a depression in which for untold ages decayed leaves had gathered; the ground was spongy and too wet for general farming purposes. Little did we think to find black soil ten or twelve feet deep. It was piled up and valued only as swamp mud, but when it sweetened and vegetable life got a chance for possession we found that grass and whatever grew on it thrived luxuriantly, showing there was body in it. Though black in color it is light in weight and does not pack. I have grown Geraniums, Cinerarias, Chrysanthemums, Calceolarias, Cytisuses, Heaths, and Azaleas in it and all have done well. So it is; much must be gained by experience, and in no other occupation is one so much subject to his environment. All the functions of gardening go hand in hand; if we fail in one, we may fail in all. Injudicious watering of plants would lessen the value of the best compost; a lack of air and the requisite amount of heat and moisture would ruin the best plants.

To pot our plants properly is only part of the work; still "whatever is worth doing is worth doing well." Potting is like cooking a hare: "you must first catch your hare;" that is, see that you have clean pots and, if new, properly deodorized. Let me explain — gardeners know that plants seldom thrive in pots fresh from the kiln; exposure to the weathering influence of a rainstorm will sweeten them, or, lacking this, a good plan is to fill the new pots with moist earth and let it stay in them for a day or two; this earth should not be used. Next in importance to sweet, clean pots is good drainage. Crocks of broken pots are the best material to use. In healthy plants the bulk of the roots will be found among the drainage. Coal ashes are excellent for many plants, but they contain lime, and while this is a necessary ingredient in the food of some plants, it is not needed for all, and to some it is decidedly objectionable.

Plants which do the greater part of their growing during winter time, as well as those which remain a long time without repotting, require the greatest care. All potting should be done firmly and this for the most part can be done by the hand; it is seldom necessary to use the potting stick in order to pack the soil more firmly, and then only for large plants and such as have solid balls of earth, as Azaleas, Heaths, and other shrubby greenhouse plants of slow growth. I remember once hearing a story

of a youth fresh from school, about to begin his apprenticeship in a large place on the other side. He came into the potting shed, whittling a stick; on being asked what he was going to do with that, he replied he was going to pot orchids with it.

Plants which grow quickly, such as Geraniums, Heliotropes, Coleuses, Fuchsias, and what gardeners include under the general term of "soft-wooded plants," require less care; in fact, as spring advances and time becomes precious, quickly growing stock is potted with very little ceremony. A quick hand will pot several thousands of small plants in a day.

A common practice among amateurs is to put out their window plants for a summer's growth. It is often a surprise and also a pleasure to watch such plants make luxuriant growth in their natural elements — free and unrestricted root area with plenty of air and sunshine. Usually their growth is altogether out of proportion to the space they must occupy for the winter, and it seems as if they would require much larger pots. If, however, as is generally the case, the greater number are of the Zonale type of Pelargonium, or what we know as Geraniums, they will bear considerable hard treatment and may be roughly pruned in and much curtailed in amount of root room, and very likely will do as well as if more liberally treated. The same applies to almost all window plants. The disposition is to be far too generous with pot room. The conditions under which window plants must exist in living rooms are anything but congenial. I should prefer to dispense with my old stock after the summer's growth, having raised a lot of young stock in the meantime. The disposition to be generous is natural. It has always been regarded as "more blessed to give than to receive." One question the amateur is sure to ask is, "What fertilizer can I give my plants to start them up?" when all that is needed is better light and air, or more or less heat as the case may be. Artificial manures, no matter how attractively labelled, are sure to do more harm than good to window plants in winter time. If the plants are sick it will be owing to some other cause, and manures would only make them worse; it would be like trying to cure a dyspeptic with a course of high living.

A word or two on the use of artificial manures in the liquid form for potted plants may not be out of place here. It is intended by their use to increase growth and general productive-

ness whether it be fruits or flowers. More skill is required to continue a crop of flowers or fruits in productiveness after it has exhausted the natural resources of the soil than in bringing it to this condition; this is the mark of success with some men. It is not my intention here to name one manure above another: there are a dozen good ones, only some are safer to use than others. One of the simplest and best is the dregs from the barn-yard. They contain in a highly concentrated form nearly all the constituents of a complete plant food; but even this cannot be used unstintingly. Some experience and good judgment will be required to gauge properly the amount which may be safely used in proportion to clear water. It is well to start with a one-eighth strength and increase it as experience dictates. I have used dry Colorado sheep manure, at the rate of a peck to fifty gallons, and this is right to use without fining down. Sulphate of ammonia or nitrate of soda may be used at the rate of one pound to fifty gallons of water; these are really stimulants and not lasting manures. Their action is quick both of benefit as well as injury, and an overdose is a terrible trial for one to experience. These should only be used as alternatives. Some of us have used Albert's Horticultural Manure, which is an excellent article in the hands of a cautious person, but an overdose is awful. I am not skilled in mixing manures; but am satisfied to use one at a time. Liquid manures should be used only on plants making healthy growth, and the drainage must always be free. It is very seldom that sick plants will be benefited.

The sowing of seed, when the quantities are small and often precious, requires some special mention. Here again few gardeners are in accord. In giving my own methods I know I am likely to run counter to many experienced practitioners. Mr. Jackson Dawson, of the Arnold Arboretum, and an old fellow at the Harvard Botanic Garden, whose name I regret I never knew, could give many of us points on sowing seeds and raising seedlings; still some general rules may here be given.

Sixty degrees Fahrenheit is a good temperature in which to germinate seeds of tender plants coming from semi-tropical regions. Tropical plants require somewhere in the neighborhood of eighty degrees, while seeds of many hardy plants germinate well enough at sixty, but for some even this will be too high, especially for many kinds of clematis and all such as take a long

time to germinate; some will germinate in a temperature scarcely above freezing. A light sandy loam with some leaf soil, charcoal, and brick dust sifted together will suit all seeds. Boxes or pans may be used with crocks over the holes and coarse siftings laid above this and the boxes filled with the prepared soil to within half an inch of the top and pressed firmly, then mark out drills with the edge of a label or bit of wood and scatter the seeds along; vary the depth of the drill according to the size of the seeds. Very fine seeds need no drill and may be scattered upon the surface. A shaking will generally cover the seeds enough, and the surface should again be pressed firmly with a brick or something which will leave a smooth surface. With the exception of very coarse seed, I do not practise overhead watering, preferring the sub-irrigation plan of immersing the boxes or pans to the edge, letting the water in from below. Less frequent wetting will be required and most seedlings will be up before a second application is necessary. There are several ways of disposing of the seed pans until germination takes place. I usually put over them a piece of glass and a light shading of paper; but where space is limited I have set them away in tiers, so that the bottoms do not actually rest upon the tops of those below them, and find they do almost as well as when spread over more space. As fast as germination proceeds I expose the young plants to light and air. At this stage they require very careful watering, or the whole lot will damp off in a single night. Seedlings should be transplanted as soon as large enough to be handled conveniently.

In what I have said it has not been my intention to lay down any strict rules in regard to the use of soils and potting. I should be travelling on altogether too dangerous ground. I have preferred rather to deal with some general principles on which these operations are based.

Discussion.

The lecture was illustrated by examples in potting plants, rapid potting being shown by three Ageratums, while careful potting was illustrated by the Begonia.

The lecturer said that seedsmen should always state in their catalogues, especially with regard to new plants, whether they are from tropical, temperate, or cold regions.

A lady asked how to repot a Rubber Plant. Mr. Hatfield said that the example given would be just right; he would not cut off any roots, but he would like to see the plant first.

Thomas Harrison asked what the method of preparing bone meal was.

Mr. Hatfield replied, "Take half a dozen cart-loads of turf and three hundred pounds of bone meal. The value of bone meal is increased by fermentation, which process is accompanied by heat, and often destroys insects and weed seeds." He said he would not use bone meal on Geraniums.

Mrs. E. M. Gill said she used it, and that her Geraniums did well.

A stranger asked how much sheep manure would be used with six cart-loads of turf. Mr. Hatfield considered five to six hundred pounds enough.

George D. Moore said that he used bone meal liberally on Lettuce, and it prevented "dropping." He used bone meal which was as fine as flour, and gave it to Cucumbers as well as Lettuce; in two hills left without it the vines were a foot less in growth in a short time.

W. D. Hinds asked the difference between bone meal and bone flour. Mr. Moore answered that the bone flour is so fine that it has to be put in double bags.

A gentleman asked whether old potting soil can be used a second time.

Mr. Hatfield replied that he saves old potting soil when he thinks it good enough, and uses it for annuals, such as Asters, Zinnias, Stocks, and Verbenas.

President Appleton inquired if it did not make a difference whether it is thrown over and aerated.

Mr. Hatfield said that it did. Some soil is too good to throw away, and most any can be renovated by aerating and sweetening.

A Geranium was potted to illustrate how many roots may be taken off.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 27, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture was delivered on the John Lewis Russell Foundation:

THE SPREAD OF PLANT DISEASES — A CONSIDERATION OF SOME OF THE WAYS IN WHICH PARASITIC ORGANISMS ARE DISSEMINATED.

By Dr. ERWIN F. SMITH, Assistant Pathologist, Division of Vegetable Physiology and Pathology, United States Department of Agriculture, Washington, D.C.

The subject selected for this address is a rather large one for treatment in a single lecture. Parasitic diseases of plants are disseminated in a great variety of ways. I shall not try to cover the whole field. All I desire or expect to do at this time is to call your attention in a plain, straightforward way to certain well-known facts, and to others not so well known, drawing as I proceed certain inferences or conclusions which may be of use to you hereafter in your daily work. This lecture will necessarily be rather categorical, and not of much interest, I fear, except to those who are actually growing plants as a means of livelihood. I shall for the most part neglect the common and well-known dissemination of parasites by wind and water, and deal chiefly with methods of dissemination which are to a large extent within our control. "The wind bloweth where it listeth," and we cannot stop it, but there are certain dangers we may avoid, and some of these I will endeavor to point out. I wish particularly to show how farmers, fruit growers, florists, market gardeners, and all who have to do with the growing of plants are themselves not infrequently responsible for the spread of diseases, which either destroy their crops outright or leave the balance on the wrong side of the ledger. If I can make this one fact perfectly clear to you, your own reading and reflection will do the rest, and I shall not have cast my seed into stony places or by the wayside.

As you all know, our modern intensive cultivation of flowers, fruits, and vegetables for market purposes is beset with many

difficulties. To a transient visitor who strolls about, admiring the regularity, thrift, and fruitfulness of every plant in sight, it may seem an easy matter to grow violets, roses, or chrysanthemums; tomatoes, cauliflowers, or cucumbers; strawberries, grapes, or cherries, as the case may be. Certainly nothing seems easier, and just as certainly no business of life is beset with more difficulties, requires more constant attention, more good judgment, more knowledge derived from painful experience, or more thoughtful consideration of every least detail of the business. The transient visitor sees the brilliant successes; what he does not see is the long line of mingled successes and failures, the worries and disappointments, the long experience and sleepless care of years, which have led up to this fine consummation. If he thinks such results are born full-fledged out of Mother Earth, like Minerva from the brain of Jove, and that all one has to do is to plant seeds or set out cuttings and wait contentedly for the early and the later rains, let him try for himself. It is usually easy to find some pessimistic mortal with greenhouses and trucking grounds for sale, and he can begin at once, if so inclined, let us say, on cucumbers or tomatoes for the winter and early spring market. He has himself paid fifty cents a pound for tomatoes and ten cents apiece for cucumbers, and knows there is "big money" in it. Let us follow our optimistic friend for a time and see what happens. He starts in well and early the first season. He is up with the lark and overflowing with energy. Things must gee. He has the writings of Peter Henderson by heart and all he lacks is experience. Let us drop in some months later. The plants are not doing well; the crop has practically failed. What is the matter? The seeds were poor, and did not come up, or germinated slowly and irregularly, or the seedlings damped off in great numbers, necessitating a second sowing, which set the crop back and brought the product into an overflowing market with poor prices. Or the soil was not properly selected, and yielded only inferior plants and stunted fruits, in spite of all care and coaxing. Or, possibly, the crop may have started off well, but the gardener or other help did not understand firing or the management of ventilation, the plants being nearly roasted at times, in spite of the plentiful supply of expensive thermometers hung in all parts of the house, and then suddenly chilled with floods of cold air by way of compen-

sation. Or, finally, perhaps the chief trouble was in the use of water. The management of water in hothouses is a fine art. Nothing requires better judgment and in nothing is our friend less experienced. The plants suffered at times and in particular parts of the house, let us say, from lack of water, and then were drenched by the hired man; or the unsatisfied owner, seeing that things were going wrong, took the watering out of the hands of the foreman and daily flooded the house himself according to ideas evolved out of his own inner consciousness. About this time slugs, scale insects, red spider, plant lice, nematodes, and a variety of fungous diseases made their appearance in alarming proportions, and some man of my profession was sent for. Of course, he found a most interesting set of conditions, — interesting, I mean, to the pathologist, — and, possibly, was able to afford the disheartened grower the cold comfort of some good advice about what not to do next time. This is an extreme case, and yet there are plenty of such cases every year around every great city, and the troubles and failures are not all confined to beginners or to plants grown in hothouses. If the tyros were the only sufferers, we might be content to let them alone, trusting to the hard doctrine of the survival of the fittest as the all-sufficient remedy. This, however, is not the case, even old growers sometimes experiencing great losses which might have been avoided. There are now so many people engaged in growing things for market, and competition on most crops is so very close and the profits so small, that even the most experienced and successful grower must stop every leak in his expense account, and take advantage of every least chance for increasing the quantity, quality, earliness, etc., of his crops. This he can do only by a thorough understanding of all the conditions necessary for successful growth, the avoidance of parasitic diseases being one very important consideration. It is just here that plant physiologists and pathologists, while themselves learning much from the practical grower, may nevertheless be able to render him very material assistance. As such an individual, I have been invited to address you.

If, however, you expect me to tell you today how parasitic diseases may always be avoided, you are expecting the impossible and will be disappointed. The most I can do is to tell you how some of them may be prevented, and put you on your guard as to

the doing or not doing of certain things. Along with what I shall say today, I would have you remember that plant pathology is a very new science, of which as yet we barely know the rudiments.

Every year, however, adds to the sum of our exact knowledge, and it will not be long before those growers who learn and apply this new knowledge will outstrip their fellows, and have the field to themselves. Competition is not likely to decrease, nor are prices likely to advance very much, and the profits must come from avoiding losses.

It is particularly to this enterprising class of men that I should like to speak concerning the restriction of plant diseases. In this art, as in that of modern medicine, an ounce of prevention is worth many pounds of cure. There are at least three classes of growers: First, those who never learn anything except by bitter personal experience. To such men, and I may be speaking to some of this type today, much of this address may seem theoretical and impracticable. The loss of one or two crops in succession by the attack of some preventable parasite usually affords such a man the needed personal stimulus, and thereafter, as far as my own experience with such men goes, he is a faithful convert. There is a second class of growers who believe it all, know it all, and can give pointers to any expert, but are what might be called eleventh-hour men. Whether from inertia, love of ease, or inability to plan, they never get around to try any preventive until the mischief is done. Such men are the worst to deal with, since they are pretty certain to apply some remedy when it is too late, and equally certain to declare afterwards that all such remedies are worthless, as they know from "personal experience," having tried them. There is a third class of growers who are very quick to see and equally quick to apply anything likely to add to their pecuniary profit. Probably no country in the world has more men of this type than our own. They are the men whose hard common sense will try what stuff the specialist's fine-spun theories are made of, and woe to him if he is a quack, for they will surely find him out! It is this class of men whom I most fear, and at the same time most desire to reach.

I may take for granted that all of you already know that diseases which prevail extensively, and are known as contagious or "catching" diseases, are due to parasites. This is true not

only of human and animal diseases, but also of plant diseases. The plant world has its own consumption and leprosy, its cholera and black plague, its typhoid and malaria, its grippe, diphtheria, anthrax, and glanders — diseases due to other organisms and totally different, of course, in their symptoms from those I have named, but no less widespread and destructive in their course, and no less amenable to hygienic measures, than the terrible human and animal scourges with which we are all more or less familiar.

These plant parasites are plants or animals which have in some way lodged on or gained an entrance into the plant, or "host plant," as we usually designate it, and which there multiply to its detriment. Many of these organisms are exceedingly small, so as to be readily overlooked, and all of them are well provided with means of reproduction. In case of the parasitic fungi the reproductive bodies developed on a single host plant often amount to hundreds of thousands, and in case of bacteria even to hundreds of millions. These bodies are, of course, very small, requiring good microscopes and other facilities for their study, but if the conditions are favorable a single one of them may be all that is necessary to start disease in a healthy plant.

Why, then, are not all our plants destroyed outright? This leads to another question, viz., what constitutes a parasite? In a crude way, and for the sake of convenience, we often divide the lower organisms into two classes — saprophytes and parasites; the former obtaining their nourishment from dead and decaying substances, the latter nourished at the expense of other living organisms. There are, however, all grades of saprophytism and of parasitism. Any saprophyte may become a parasite if it can gain an entrance into the plant, and can there find conditions adapted to its growth. There is a constant struggle for existence in all animate nature, and one organism or another prospers according to environmental conditions. Sometimes the advantage is wholly with the host plant, at other times largely with the parasite. Many saprophytes become only slowly adapted to parasitic ways of living. Many parasites are very sensitive to light, to heat, to dry air, and perish in a short time if exposed to these conditions. Many parasites will thrive only under unusual conditions of heat and moisture. Many of the higher plants have devised special means for their own protection, such as the physical obstacle of a thick and hard covering not easily penetrated, a waxy covering

not easily wetted, a smooth covering from which the water runs off quickly; or have interposed chemical obstacles, such as a sap not adapted to the growth of the parasite. These then are some of the reasons why all of our plants are not immediately attacked and destroyed. To sum up or restate the case: First, the parasite is very liable to be destroyed by adverse conditions before it reaches the plant. Second, it must gain an entrance into the plant by its own exertions or by the help of other organisms, and this may be difficult or impossible. Third, once in, its growth may be effectually stopped by insuperable chemical or physical obstacles. Not every potential parasite becomes an actual parasite. The difficulties lying in the way are often too great for the organism to overcome and consequently a good portion of our crops escape. The business of the pathologist is to find out just what these difficulties are in case of each particular parasite and to teach the grower how he may increase them.

The most of this address will be devoted to showing just how certain parasites succeed in getting from one plant to another. It is commonly assumed, I know, that their reproductive bodies float through the air and accidentally lodge on the plants, but while not denying that this often occurs, and is perhaps in many cases the exclusive means of infection, I am certain that in some cases this rarely or never occurs, and I am inclined to believe, for reasons which I will now explain, that in quite a large number of diseases the chief danger of infection lies in other directions. I shall occasionally refer to preventive measures, but with the facts before you, you will in many cases be able to draw your own conclusions as to the best method of procedure.

The first subject to which I invite your attention is the spread of parasite organisms by means of insects.

Spread by Insects.— This is a method of distribution which has received little attention from the cultivator, but one which I am persuaded is very common. The gnawings, borings, and punctures of insects, injurious as these often are, can by no means be reckoned as the whole of the injury which they do, and sometimes they are the least part of it. As carriers of disease they are no less potent in the vegetable than in the animal world. In what I have to say under this head I shall deal only with three diseases, but these are widespread, and their dissemination by insects has been fairly well worked out:

Pear Blight. — I will not undertake to say who first ascribed the spread of this disease to insects, but the honor of clearly proving it to be so disseminated belongs to Mr. Merton B. Waite. He it was who first isolated the pear blight germ from the mouth part of bees which had visited blighting pear flowers; who saw bees pass from such flowers to healthy ones and the blight subsequently appear in the latter; and who afterwards showed conclusively on a large scale that pear flowers covered by mosquito netting always remained free from blight, while the unprotected, insect-visited ones blighted freely. There is not only no doubt that pear blight is spread through the agency of insect visits, but so far as he has been able to determine, it is never disseminated in any other way. The organism exudes from the tree in the form of small sticky or gummy masses which are not likely to be blown about by the wind, and is easily destroyed by drying. The disease occasionally winters over in the tree, and so far as Mr. Waite has been able to determine all the spring outbreaks of pear blight start from these hold-over cases, as a result of insect visits, and not from the soil. Indeed, we have as yet no evidence that pear blight lives over in the soil.

Bacterial Wilt of Cucumbers, Muskmelons, Pumpkins, and Squashes. — This is a common disease in the northern United States, and often does great injury. It is due to a very sticky, white micro-organism which fills the water ducts, and thus brings about a sudden collapse of the plant. I have experimented with it extensively since 1893, and find it to be readily communicated by the striped cucumber beetle and sometimes also by squash bugs. Wilting vines are very full of virulent, sticky germs, ready to be carried away on the beak or jaws of the first visiting insect and deposited on the surface or in the interior of the next plant that is bitten. On one occasion I examined nearly a thousand freshly blighted leaves, and found small gnawed places inside of the blighted area of every one, and in such relation thereto that the wilt appeared to have proceeded outward from the bitten places. Subsequently I produced the disease by allowing striped beetles and squash bugs to feed on diseased leaves and then on healthy plants. My greenhouse inoculation experiments with this bacillus now exceed four hundred, but I have never had the disease escape from inoculated plants to controls, and I believe that in the field it is spread almost wholly, if not exclusively, by insects. In

what form or in what place it passes the winter, I do not yet know, but given one affected plant in a squash or cucumber field in June or July, and plenty of beetles to feed on it, and in a month or six weeks there will frequently be more diseased than healthy plants. That all are not destroyed by it appears to be due largely, if not wholly, to the fact that it is readily killed by exposure to sunlight and to dry air.

Bacterial Brown Rot of the Potato, Tomato, and Egg-Plant. — The Department of Agriculture has recently published a bulletin on this disease, which some of you may have seen. This disease is also disseminated by insects, and in all probability owes the greater part of its destructiveness to this fact. The insects feed on diseased plants that are swarming with the parasite and then crawl or fly to other plants, which are bitten and subsequently become diseased. I do not yet know how widespread this disease may be, but am now inclined to attribute to it a large part of the potato rot of the eastern United States. It may be known by the sudden wilt of the foliage, the stems becoming brown internally and shrivelling. The bacillus passes down the interior of the stem into the tubers, and brown-rots them from within. I succeeded in communicating this disease from sick to healthy plants very readily by means of Colorado potato beetles. They were taken from healthy potato fields which remained healthy, were allowed to feed on diseased leaves and stems for a few hours and then transferred to healthy plants, which they gnawed a little in various places, but from which the beetles were removed before they had done any serious injury of that sort. Seven to nine days later the plants suddenly developed the disease on many parts of the top, corresponding to many bites, and the progress of the disease after the first day or two was rapid. As the spread of this disease is simply a matter of the transfer of a few germs from the interior of diseased to the interior of healthy plants, I do not see why any gnawing or puncturing insect might not serve just as well as the potato beetle as a carrier of this disease.[1]

Spread by Snails and Slugs. — The rôle of mollusks in the dissemination of fungous and bacterial diseases is also an impor-

[1] As this paper goes through the press (Feb., 1898), Dr. W. C. Sturgis, of the Connecticut Agricultural Experiment Station, reports the interesting discovery that the mildew of Lima beans (*Phytophthora Phaseoli*, Thaxter) is disseminated by bees which visit the flowers for nectar.

tant one. The subject is new even to scientific men, and most cultivators know nothing about it. Nevertheless, the indirect damage done by these animals as carriers of disease germs is often immensely greater than the immediate and visible injuries they induce by feeding. Again I shall refer only to a few cases, but these I consider to be well-established ones.

Wagner's Experiment with Snails. — Last year a German by the name of G. Wagner published an interesting paper on the spread of fungi by snails. He experimented with downy and powdery mildews, ascomycetous fungi, and rust fungi. Snails of various sorts were transferred from diseased to healthy plants, and the disease appeared on the latter; they were fed various parasitic fungi, and a subsequent examination of the excreta showed that the spores of these fungi passed through the animals uninjured, and in condition to germinate. Finally, the dung of these snails was dissolved in water and painted on the leaves or stems of host plants and the disease followed.

In this way, three downy mildews, two powdery mildews, one Nectria, and one rust fungus were transferred to healthy plants of various sorts. Mr. Wagner thinks that fungi are very commonly distributed by snails.

Galbraith's Experiments. — Mr. Galbraith, an Englishman living in the Seychelles islands, has recently obtained equally interesting results with snails, which he finds to be largely responsible for the spread of a vanilla disease prevalent in those islands.

The Bacterial Brown Rot of Cabbage. — This disease is prevalent in many parts of the United States, and is tolerably well known to market gardeners. It blackens the veins of the leaves and the woody ring in the stem, causes the leaves to fall off, and prevents the formation of heads, or spoils those which have already formed. It is due to a micro-organism, and is disseminated in various ways. I have myself the present winter obtained striking infections by means of the common greenhouse slug. These animals were fed on diseased cabbage leaves and then transferred for a few hours to healthy cabbage plants, the disease appearing a week or two later. Insects are probably also carriers of this disease.[1]

I will next invite your attention to the danger of spread of parasitic diseases by way of the manure pile.

[1] Since this was written I have obtained conclusive evidence, using the "Southern cabbage worm" (larva of *Pieris brassicæ*), and have been able to confirm these green-house experiments by many observations in the field.

SPREAD THROUGH THE MANURE PILE. — Barnyard manure always contains a great variety of organisms, most of which are harmless to plants. Occasionally, however, some parasite gets into the manure heap, finds a congenial place for extended growth, and is finally hauled out by the unsuspecting cultivator and put just where it can do him the most damage. Sometimes the spores of these parasites get in through the fodder or bedding, but they are also probably occasionally introduced along with mouldy or rotting vegetables which have been thoughtlessly thrown into the barn yard or on to the manure pile. One of the most striking cases that has come under my own observation is worth describing somewhat in detail.

The Watermelon Wilt. — This disease of the watermelon is due to a fungus (*Fusarium niveum*) which enters the plant through the soil and fills up its water-conducting system, causing sudden wilt and subsequent death. It prevails extensively from South Carolina to Texas, and is by far the worst trouble melon growers have to contend with. The fungus lives over winter in the dead stems, and grows readily in manure. In 1894 I was sent to South Carolina to investigate this disease, at the urgent request of a planter who had lost nearly his whole crop. Nothing was then known as to the cause of the disease, and the conclusions I shall here give you are based on studies of the disease which have since been made in the laboratory and field. The man of whom I speak had planted seventy acres, and nearly the whole crop was affected by this disease, just that part of the field being most severely attacked that had been most carefully manured. He had formerly been a very successful melon grower, but had suffered some from this disease the preceding year. In order to have an extra fine crop, by way of compensation for losses of the previous year, he had raked and scraped every bit of litter he could procure from the whole farm, and made a large compost heap in his barnyard. Into this heap went also the refuse of a thirty-five acre melon field of the preceding year. This consisted principally of hay cut from the field in the fall, and including many dry melon vines full of the fungus, which only needed the moisture and food supply of the dung heap to grow again luxuriantly. In the spring, when he had unwittingly made an immense culture bed of his barnyard, he hauled out this infected manure and put it under his melon hills, with most disastrous results. I

have since obtained confirmatory results in other places, and am very certain that this disease was in that instance spread by way of the manure pile. Probably it is often disseminated in this manner. I shall have more to say of this interesting disease under another head.

Smut Diseases. — Some of the smut diseases are also well known to be transmissible through dung, especially in fresh manure, and for this reason the latter should never be used on fields of cereals.

Other Diseases. — While not conclusive, the evidence is strong that many diseases come out of the dung pile. I recall a bad outbreak of the so-called timber rot of cucumbers in a hothouse near Washington where it seemed almost certain that the fungus was introduced with the manure. And within the last six months three cases have come to my knowledge where serious diseases followed unusually heavy applications of manure. One of those was a sclerotium disease of ginseng in Pennsylvania, another the bacterial brown rot of turnips in Maryland, and the third a rot of celery in Florida.

This subject is at least worthy of much more careful attention than it has hitherto received, and would undoubtedly amply repay all the time put upon it. Manure should at least be kept free from the rubbish of plants that have been attacked by parasitic diseases and ought to be thoroughly composted and rotted before it is used.

Spread by Way of the Soil. — Certain parasitic diseases of plants are peculiarly soil troubles. Their home is the earth. They live and multiply in the soil indefinitely as saprophytes, and yet are always ready to become parasites when there is an opportunity. Not enough attention has been paid to this class of diseases. Among these soil fungi are some of the worst enemies the cultivator has to contend with. They are hidden out of sight, are very difficult to combat by fungicidal treatment, and when a field is once well seeded down to one of them it is practically worthless for the growing of such crops as are subject to the disease, the only satisfactory management of the land in most cases being a long rotation with crops not subject to the attacks of the parasite. These soil fungi manage to get about from field to field in various ways. Some of them are known to have been distributed in irrigation water or to have been washed

from higher to lower fields by floods; some have been carried by the plow or other tools, or on the feet of animals. Occasionally man himself digs them up and transports them into hotbeds, greenhouses, and fields. One year all of our potting soil at the Department was so badly infested with the damp-off fungus that plants could be gotten past the seedling stage only with great difficulty. Frequently these fungi creep through the earth for considerable distances, destroying nearly everything they meet or only certain species of plants. Others distort or corrode underground parts without destroying the plant. Onion smut, potato scab, the club-root of cruciferous plants, the fairy-ring fungus, Rolf's sclerotium disease, the cotton root rot; the *Dematophora necatrix*, destructive to the roots of grape vines, figs, and many other plants; the *Polyporus annosus; Trametes radiciperda*, especially destructive to the roots of coniferous trees; and the root fungus of New Zealand, which is said to destroy every sort of plant in its way, are examples of these soil parasites. I shall mention particularly only one type of these troubles, viz.:

The Fusarium Diseases of the United States. — It has fallen to my lot to study some of these parasites quite carefully, and I now know eight important cultivated plants subject to them, viz., cotton, cow-pea, watermelon, cabbage, potato, tomato, sweet potato, and pineapple. Whether we have here to deal with eight parasites or with only one widely distributed polymorphic organism remains to be determined. I am inclined to think, however, from my own numerous experiments, covering a series of years and not yet completed, that we have to do with closely related but distinct forms. All of these host plants are seriously injured and some of them over wide areas. In all of them the trouble is due to a sort of embolism or parasitic clogging of the water ducts of the plant. I have already alluded to the watermelon wilt when speaking of parasites disseminated in barnyard manure, and will here devote most of my remarks to that disease. It occurs from the Carolinas to Texas, and has practically put an end to profitable melon culture in parts of South Carolina, Georgia, Florida, and Texas. The plants are attacked in all stages from seedlings to mature vines in fruit. The first sign is a sudden wilting of the whole or a part of the vine without apparent cause. The fungus enters the plant from the soil and almost always destroys it. I have seen large fields entirely

ruined by it, and know of fertile tracts miles in extent where melon culture has been abandoned. When the soil is once infested it is worthless for melon growing for a long time — five to seven years, according to South Georgia growers who have had much experience with it.

A successful Sea Island cotton grower writes that he has abandoned fifteen acres of his best cotton land on account of this blight. A New York cabbage grower informs me that his best soil, which formerly yielded abundant crops, is now worthless for cabbage growing, and I know from a careful examination that his sole trouble arises from the fact that his soil is infested with a parasitic Fusarium. Undoubtedly these troubles have arisen, or at least have become intensified, by too frequent growing of the same crop, and the best remedy is to be found in a wide rotation. At present I know of no other.

Spread by Way of Seeds, Seedlings, Buds, Tubers, Cuttings, and Nursery Stock. — One of the best examples of a disease disseminated on seeds is the loose smut of oats and wheat. The smut spores simply adhere to the sound kernels, germinate at the same time as the kernels, and bore into the young seedlings, to remain hidden till the plants blossom. The parasite of beet burn finds its way to the young seedlings in much the same way, being carried to the beet fields along with the seed. Potato scab is spread in much the same way, *i.e.*, from the mother tuber to the progeny, but this parasite also lives over in the soil. A bad lettuce Septoria, which sometimes causes much trouble, appears to be carried over from year to year, and spread from place to place in the seed.

Many diseases are distributed in seedlings, bulbs, buds, and cuttings, and too much care cannot be exercised in their selection. Among these may be mentioned the Easter lily disease, the yellow disease of hyacinths, certain violet diseases, the California vine disease, peach yellows, peach rosette, peach mildew, and peach curl.[1]

But perhaps the most wholesale manner of distribution is through the medium of irresponsible nurserymen. In this way all sorts of fungi and insect pests are spread from one end of the

[1] Since this was written I have found that the bacterial brown rot or black rot of the cabbage is often transplanted to healthy fields from the seed bed along with the young plants. (See "Farmers' Bulletin," No. 68, U.S. Department of Agriculture, for a full account of this discovery.)

country to the other. Many examples might be adduced. The most notorious recent one in this country is the wholesale distribution of the pestiferous San José scale in the eastern United States by two New Jersey nursery men. More than this, some dealers appear to be still sending out infested trees in spite of claims to the contrary. There is no good reason why all of this nursery stock should not be fumigated in a dormant condition. If done properly the scales would be destroyed without injury to the plants. The only safety for growers appears to be in demanding this, and in refusing to accept any trees or other plants which are not clean. The damage to an orchard which is certain to result from the introduction of a single tree infested with the San José scale is so great that it becomes every fruit grower to be on his guard. The white scale or West Indian scale of the peach is also very destructive and should be guarded against with great care. If by any accident it should be as widely distributed from nurseries as the San José scale has been, it would injure the peach orchards to quite as great an extent, a few years sufficing to destroy the most robust trees. I have sometimes called it the "whitewash scale" because at a little distance affected trees look as if covered with lime.

GENERAL CONCLUSIONS RESPECTING PREVENTIVE MEASURES.

1. *Prompt Removal and Destruction of Diseased Material.* — There are special reasons for this, owing (*a*) to ability of many parasites to grow and fructify on the plants, or parts of plants, which they have already destroyed, *i.e.*, to live as pure saprophytes, and (*b*) to the persistent vitality of many other sorts under what would seem to be very unfavorable conditions, *e.g.*, after being dry for months. The fusarium of watermelon grew from a dried-out laboratory culture after two and one-half years.

Practical application in:

(1) *Field.* — Pear blight, rot of stone fruits, lemon scab, black knot of plum and cherry, peach yellows, San José scale (when restricted to a few trees).

(2) *Greenhouse.* — Rust of chrysanthemums and carnations, spot of violets, rot of lettuce, black spot of roses, anthracnose and timber rot of cucumbers, wet rot of hyacinths, etc.

It is not enough to pick off the diseased parts. They must be disposed of properly. Loss may result from throwing diseased

leaves or plants under the benches. If this is the only method of disposal they might almost as well be left in place. It is generally best to burn them.

2. *Destruction of Insects and Mollusks.* — More practicable in some cases than in others.

(1) *Field.* — In the field we may make use of hand picking, nets, resin wash, kerosene emulsion, and traps of various sorts. No very satisfactory method of dealing with certain of these carriers of disease has yet been worked out. The discovery of cheap efficient ways of destroying these insects furnishes many interesting problems for the economic entomologist. A combination of this method and the preceding (removal of diseased material) is recommended for such diseases as the brown rot of the potato and cabbage and the bacterial wilt of cucurbits. Root aphides may sometimes be reached by tobacco dust dug into the soil. Root nematodes specially infest certain soils, and are difficult to combat.

(2) *Hothouse.* — The troubles most prevalent in hothouses are aphides, scale insects, red spiders, root nematodes, roaches, and slugs. Slugs may be handpicked at night. Roaches are easily poisoned with a mixture of phosphorus and honey. Nematodes in hothouses are seldom troublesome except when the potting soil is full of them to begin with or when the plants have been systematically overwatered, and in either case the remedy is obvious. Red spiders are often very troublesome, especially when the air of houses has been kept too dry. They are not easily destroyed by the common insecticides, snapping their legs, so to speak, at tobacco smoke and even at the deadly hydrocyanic acid gas, of which they can endure more than the plants. The best remedy is not to let the plants become infested, and the best palliative is frequent douching of the plants with a fine spray of water. Plant lice are readily held in check by fumigation with tobacco. This, however, must be managed with care, as radishes, violets, and some other plants are peculiarly sensitive, and a single careless fumigation might do more injury than a dozen generations of aphides. I have seen the following arrangement for fumigation in a large rose house in Washington, and many of you are probably already familiar with it: Long, narrow, shallow galvanized-iron pans half full of a very strong tobacco water were distributed down the aisles of the house, and into these about once a week was dropped a good-sized red-hot

rod or spike. These spikes were heated in the furnace and carried rapidly through the house in an iron basket. The house is quickly filled with tobacco steam. The manager assured me that this method was cheaper, less injurious to the plants, and more effective than the ordinary dry air method of tobacco fumigation. They were cutting thirteen hundred buds a day from this house and the thrift and beauty of the plants were remarkable.

Scale insects are not so easily killed; most of them will thrive on tobacco smoke and ordinary sprays. We have, however, found hydrocyanic acid gas very cheap and effective. It is a deadly poison, and must be used with the greatest care. In intelligent hands I am persuaded that it is the coming remedy for this class of troubles. There must, however, be considerable experimenting and testing on the part of specialists before it comes into general successful use. Not only does it quickly diffuse through the air and speedily kill those who breathe it, but it also kills the plants as well as the scales, if the dose is too strong. Furthermore, plants are sensitive to it in very different degrees, as Mr. A. F. Woods has shown, so that a dose which will not harm one plant will kill another. In any given case it must be determined in advance; first, what is the minimum dose for the scale, and, second, that this dose will not harm the plants. When these two facts have been ascertained the cubic contents of the house to be fumigated must be accurately computed, and then the proper amount of gas may be liberated after the house has been closed as tightly as possible and the roof wet down to make it still more air-tight. Details as to manufacture and liberation of the gas, method of computing air space, and proper dose for certain plants have been published recently by Mr. P. H. Dorsett, in the "Florists' Exchange," and I will not here describe them.

By use of this method I have seen one hundred thousand foliage plants (coleus, achyranthes, etc.) which were covered with orthezia and ruined for transplanting freed from every scale in twenty minutes' time at a trivial expense, and without the least injury to the plants. I have also known of the gas being used successfully in violet houses for the destruction of aphides.

(3) *Fungicidal Treatment.* — Among fungicidal treatments may be mentioned sulphur dusting, use of lime, use of mercuric chloride, hot-water treatment, and spraying with copper compounds. Diseases amenable to one or other of these treatments are

powdery mildew, club-root of crucifers, potato scab, wheat and oat smut, downy mildew of grape, black rot of grape, pear and quince leaf blight, pear and apple scab, melanose of orange, and damp-off fungi.

(4) *Indirect Methods — i.e.,* by furnishing the host plant with the best possible conditions for growth and the parasites with the poorest. To apply these measures properly requires a very considerable body of knowledge, both of the needs of the crop grown and of the life history of the parasite. Here is just where many growers fail, and this is why so many hothouses seems to have been erected as a special banqueting chamber for bugs and fungi of all sorts. The first thing that the owner of such a house needs to do is to learn the habits of the parasites and study the requirements of his plants until he can properly repress the one and cater to the other. Many houses are badly adapted to the requirements of the crops grown in them.

Some of the diseases commonly observed in houses, and due almost wholly to mismanagement, may be noted very briefly:

The powdery mildew of the rose, cucumber, etc., is brought on very largely by chill due to improper ventilation. Cucumber anthracnose and the timber rot are favored by excess of water and insufficient ventilation. Some houses are so constructed that they cannot be properly ventilated. Timber rot is found specially in damp corners, where the water remains in the angles of stems and leaves for hours together. The lettuce rots due to Botrytis and to the downy mildew are often brought on by excess of water and irregular heating. If time permitted, many other instances might be cited.

Sometimes these troubles are due to the attempt to grow too many kinds of plants in the same house. In such cases the grower generally tries to follow a medium course in the matter of heat, ventilation, and water-supply, and in doing so furnishes normal condition for none of his plants.

Certain field diseases may also be restricted by stimulating the plants to make the best possible growth, or in case of the onion smut, as Dr. Thaxter and Dr. Sturgis have shown, by growing the plants in soil free from the fungus and not setting them out into the infected earth until they are beyond the receptive stage.

Concerning care in the use of manure, in the selection of seeds and cuttings, and in the buying of trees and other plants, I need not say more than I have already done.

CONTENTS.

PAGE

PREFATORY NOTE, ... 3

BUSINESS MEETING, January 2, 1897; Address of President Appleton, pp. 5–10; Appropriations for 1897, 10; Addition to the Act Incorporating the Society, 10, 11; Appointment of Treasurer and Secretary, 11; Memorial of Samuel G. Damon, 11; Vote of thanks to the President, 12; Motion concerning Peach Yellows negatived, 12; Letter from Boston Mycological Club read, 12; Two members elected, 12; Programme of Lectures and Discussions announced, ... 12

MEETING FOR LECTURE AND DISCUSSION, January 9; Tropical Horticulture, with Illustrations of the Principal Economic Plants of Hot Climates, by Prof. George Lincoln Goodale, ... 12–19

MEETING FOR LECTURE AND DISCUSSION, January 16; The Structure and Classification of Mushrooms, by Hollis Webster, ... 20–28

MEETING FOR LECTURE AND DISCUSSION, January 23; The Chrysanthemum: Its Past, Present, and Future, by Edmund M. Wood, pp. 28–42; Discussion, ... 42, 43

MEETING FOR LECTURE AND DISCUSSION, January 30; Plant Beauty, by Henry T. Bailey, ... 43–46

MEETING FOR LECTURE AND DISCUSSION, February 13; The Sweet Pea, the Flower for Everybody, by Rev. W. T. Hutchins, pp. 46–60; Discussion, ... 60–64

MEETING FOR LECTURE AND DISCUSSION, February 20; Some Phases of Market Gardening, by T. Greiner, pp. 64–73; Discussion, ... 73–77

MEETING FOR LECTURE AND DISCUSSION, February 27; Good Food from the Garden, by Miss Anna Barrows, pp. 77–86; Discussion, . . . 87, 88

MEETING FOR LECTURE AND DISCUSSION, March 13; Horticulture in Canada, by Prof. William Saunders, ... 88–106

MEETING FOR LECTURE AND DISCUSSION, March 20; Soils and Potting, by T. D. Hatfield, pp., 107–115; Discussion, ... 115, 116

MEETING FOR LECTURE AND DISCUSSION, March 27; The Spread of Plant Diseases: A Consideration of Some of the Ways in which Parasitic Organisms are disseminated, by Dr. Erwin F. Smith, . . . 117–133

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1897.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1898.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, April 3, 1897.

A duly notified Stated Meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

Benjamin M. Watson, Chairman of the Committee to procure a portrait of Ex-President Nathaniel T. Kidder, reported that the Committee had performed that duty, and asked to be discharged. The report was accepted and the Committee was discharged.

The President read a communication from J. D. W. French, Chairman of the Committee on Lectures and Publication, stating that the Committee desire suggestions as to subjects and lectures for another year; also that a book is in the hands of the Secretary where such suggestions can be inscribed, and that the Committee desire the coöperation of the members in making the lectures as far as possible instructive and entertaining.

Charles E. Richardson read his Annual Report as Treasurer for the year 1896, which was accepted, adopted, and ordered to be printed.

O. B. Hadwen announced the decease of Edward Winslow Lincoln, an Honorary Member of this Society, and for thirty-five years Secretary of the Worcester County Horticultural Society, and who had devoted his life to the advancement of Horticulture, and moved the appointment by the Chair of a committee to prepare memorial resolutions. The motion was carried, and the Chair

appointed as that Committee Mr. Hadwen, E. W. Wood, and Robert Manning.

Benjamin M. Watson announced the decease of Charles Eliot, who, he said, was a man thoroughly identified with horticultural matters from the time of his graduation from college, — few had been so thoroughly identified, — and moved the appointment of a committee to prepare a memorial of him. The motion was carried, and the Chair appointed as that Committee Mr. Watson, Ex-President Dr. Henry P. Walcott, and James H. Bowditch.

It was voted that the Committees on memorials to Messrs. Lincoln and Eliot be authorized to send the respective testimonials to the families of the deceased as soon as prepared.

Robert Manning announced the decease of Dr. Robert Hogg, of London, editor of the "Journal of Horticulture," author of the "Fruit Manual," and one of the leading horticulturists of Great Britain, and a Corresponding Member of this Society. It was voted that the President and Secretary write a letter to the family of Dr. Hogg expressing the Society's sense of the loss sustained by it in his decease.

The subject of awards of premiums and gratuities to persons not members of the Society was brought up by the President, and after discussion by M. H. Norton, Joseph H. Woodford, William C. Strong, William J. Stewart, O. B. Hadwen, and Mrs. E. M. Gill, the subject was, on motion of Mr. Hadwen, referred to the Executive Committee with full powers.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

GEORGE B. DORR, of Boston,
CHARLES H. REA, of Norwood,
FREDERIC J. REA, of Norwood,
CHARLES SANDER, of Brookline,
THOMAS J. GREY, of Chelsea,
ERNEST W. BOWDITCH, of Milton,
MRS. MARY L. STEVENS, of Cambridge.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, May 22, 1897.

A Special Meeting of the Massachusetts Horticultural Society was holden at eleven o'clock today, in accordance with the following request:

To the President of the Massachusetts Horticultural Society:

DEAR SIR: We hereby request you to call a Special Meeting of the Society, to be held on Saturday, the twenty-second day of May next, at eleven o'clock in the forenoon, to determine whether the Society will ratify an agreement lately made by the Finance Committee, subject to ratification by the Society, for the settlement of the controversies respecting the validity of the will and trusts of Francis B. Hayes, deceased; and also to consider what action the Society will take for the determination of questions which have arisen or may arise respecting the interests of the Society under said will and trusts, and the care and management of property which may come to the Society thereunder.

BOSTON, May 17, 1897.

(Signed) WALTER HUNNEWELL,
BENJ. C. CLARK,
T. O. FULLER,
NATHANIEL T. KIDDER,
CHAS. H. HALL,
CHAS. E. RICHARDSON,
JOS. H. WOODFORD,
GEO. F. PEIRCE,
A. SHUMAN,
E. J. MITTON,
CHAS. W. PARKER,
ROBERT MANNING.

In compliance with this request, agreeably to Section XII of the Constitution and By-Laws the following notice was sent by mail to every member of the Society:

MASSACHUSETTS HORTICULTURAL SOCIETY,
BOSTON, May 17, 1897.

Agreeably to the Constitution and By-Laws, at the request of twelve members of the Society the President hereby calls a

Special Meeting of the Society, to be held at Horticultural Hall, No. 101 Tremont Street, Boston, on Saturday, the twenty-second day of May, 1897, at eleven o'clock in the forenoon, to determine whether the Society will ratify an agreement lately made by the Finance Committee, subject to ratification by the Society, for the settlement of the controversies respecting the will and trusts of Francis B. Hayes, deceased; and also to consider what action the Society will take for the determination of questions which shall have arisen or may arise respecting the interests of the Society under said will and trusts, and the care and management of property which may come to the Society thereunder.

(Signed) FRANCIS H. APPLETON,
President Massachusetts Horticultural Society.

ROBERT MANNING,
Secretary.

At this meeting the President, FRANCIS H. APPLETON, was in the chair. The call for the meeting was read by the Secretary. It was voted to dispense with the reading of the records of the last meeting.

The President appointed the following named members as the Committee on School Gardens and Children's Herbariums for the year 1897:

Henry L. Clapp, *Chairman.*

Mrs. H. L. T. Wolcott,	Mrs. P. D. Richards,
George E. Davenport,	William P. Rich,
Miss Katharine W. Huston,	W. E. C. Rich, *Secretary.*

The President stated that Joseph B. Warner, Esq., who had been employed by the Finance Committee as counsel for the Society in the Hayes will case, was present, and it was voted to hear Mr. Warner in regard to that matter.

Mr. Warner submitted to the meeting an agreement dated May 14, 1897, made by the Finance Committee, on behalf of the Society, with Nino K. Hayes, William Minot, guardian of Harold Hayes, and Augustus P. Loring, and approved by the Attorney-General of the Commonwealth, providing for the settlement of certain questions respecting the will of Francis B. Hayes, deceased. Subsequently it was moved by Ex-President William C. Strong, and seconded by Benjamin P. Ware, that the following vote be passed:

Voted, That the agreement which has been submitted to this meeting, dated May 14, 1897, and made by the Finance Committee, on behalf of this Society, with Nino K. Hayes, William Minot, guardian of Harold Hayes, and Augustus P. Loring, and approved by the Attorney-General of the Commonwealth, providing for the settlement of certain questions respecting the will and trusts of Francis B. Hayes, deceased, is hereby ratified, and the Finance Committee, or a majority of its members as it may be at any time constituted, are hereby authorized to do all acts, execute all papers and instruments on behalf of the Society, and make all payments which may be necessary or proper, in their judgment, to confirm said agreement and carry out its terms.

This vote was unanimously passed.

It was then moved by Ex-President William H. Spooner, and seconded by Mr. Ware, that the following vote be passed:

Voted, That the whole matter of the interests of this Society under the will or trusts of Francis B. Hayes, deceased, is hereby referred to the Finance Committee, with full power to that Committee, or a majority of its members as it may at any time be constituted, to determine, in their discretion, or by proceedings at law or equity, or by compromise, or in any way which may seem to them wise, all questions which have arisen or may arise in any way concerning the rights and interests of the Society under said will or trusts, or concerning the care, management, valuation, or disposition of the property covered by said will or trusts; and generally with full power to act in all respects for this Society in all matters concerning its interests under said will and trusts; and with full power also to invest any money which may come to the Society from said will or trusts until further action shall be taken by the Society concerning the same.

This vote also was unanimously passed.

Augustus Parker moved that a vote be passed thanking the Executive and Finance Committees and Mr. Warner, the counsel employed, for their able and discreet management of the interest of the Society in the Francis B. Hayes will case.

The vote was unanimously passed.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, July 3, 1897.

A duly notified Stated Meeting of the Society was holden today at eleven o'clock. In the absence of the President and all the Vice-Presidents, the meeting was called to order by the Secretary, and Ex-President WILLIAM H. SPOONER was elected Chairman *pro tem.*

The Chairman read a letter from John G. Barker, Chairman of the Committee on Gardens, resigning his membership of that Committee, on account of necessary absence from Boston, and thanking the Society most heartily for the honor conferred on him in electing him for many successive years to important positions on the Flower and Garden Committees. The resignation was accepted, and Patrick Norton was nominated from the floor to fill the vacancy, and elected.

The Chairman presented a report from the Executive Committee, to whom was referred at the April meeting the subject of awards to persons not members of the Society, recommending that the subject be laid on the table. The report was accepted and adopted.

O. B. Hadwen, Chairman of the Committee to prepare a memorial of the late Edward Winslow Lincoln, of Worcester, an Honorary Member of this Society, presented the following report:

MEMORIAL OF EDWARD WINSLOW LINCOLN.

In the death of Edward Winslow Lincoln, of Worcester, this Society has lost an Honorary Member distinguished for his services to Horticulture during the last thirty-five years. Endowed with a natural as well as a highly cultivated taste, improved by his long term of service as Chairman of the Parks Commission of the City of Worcester and Secretary of the Worcester County Horticultural Society, his annual reports of each have abundantly manifested his strong love of assisting Nature, in gardens, parks, and landscapes. The influence of his life work has stimulated the adornment of horticulture in public and private places, and the landscape situated within the scope of his influence is graced with additional charms which he loved to encourage.

The science, the practice, and the literature of Horticulture have

been vastly promoted by the productions of his accomplished pen, and horticultural interests have gained in solid development by his untiring labors. His life work remains an enduring monument to perpetuate his memory.

Herewith we desire briefly to place upon the record of this Society our deep sense of the loss which horticulture has sustained by his death.

O. B. Hadwen,
E. W. Wood,
Robert Manning, } *Committee.*

The report was unanimously accepted and adopted.

Benjamin M. Watson, Chairman of the Committee to prepare a memorial of Charles Eliot, presented the following report:

The Massachusetts Horticultural Society wishes to record here, through the Committee appointed for the purpose, the death of Charles Eliot, of Brookline.

It is seldom that such deep public regret is so conspicuously shown at the death of so young a man; we, as members of a Horticultural Society, have peculiar reason to mourn.

No one of the present generation has shown greater ability in matters pertaining to the art of gardening on an extensive scale than Mr. Eliot. From the time of his graduation to the time of his death all his strength and energy had been given to the improvement of public lands and private grounds.

Mr. Eliot became a member of this Society November 4, 1893.

After graduating at Harvard he took a course of one year at the Bussey Institution, spending much time in studying the trees and shrubs in the Arnold Arboretum, often coming back for this purpose after his course was finished. He soon entered the office of Frederick L. Olmsted, as a student; first, however, spending some time in Europe, familiarizing himself with foreign parks and gardens. On completing his studies with Mr. Olmsted he established himself in business in Boston, and soon obtained numerous clients.

It was at this time and later, while he was a member of the firm of Olmsted, Olmsted, & Eliot, that he became identified with those undertakings by which he will be long remembered. While a member of the Appalachian Mountain Club he was one of the

founders of the corporation known as "Trustees of Public Reservations," its Secretary and President; from this organization sprang our admirable Metropolitan Park System. Mr. Eliot was the first Landscape Architect appointed by the Commission, and he continued in their service until his death. To him, more than any other man, the community is indebted for the preservation and improvement of these large tracts of land.

He was easily the best professional writer of the day on Landscape Gardening. His style was clear, earnest, and convincing, and he allowed no minor considerations to stand in the way of what he deemed the broadest and finest treatment looked at from the future, and no man during the past few years has done so much towards crystallizing the better inspirations of our community in this direction than Charles Eliot.

Thoroughly informed by study, observation, and mature consideration, he brought also to his professional activity the influence of a trained intellect and a real personal charm.

The loss of a man who united so many admirable qualities will be long felt and sincerely remembered by his associates here.

H. P. WALCOTT,
B. M. WATSON,
J. H. BOWDITCH,
} *Committee.*

BOSTON, 14th April, 1897.

This report, also, was unanimously accepted and adopted, and ordered to be entered on the records.

The Chairman read a letter from the Boston Society of Natural History asking the Society to join with the Society of Natural History and the several leading scientific and educational institutions in this city in an invitation to the American Association for the Advancement of Science, to celebrate the fiftieth anniversary of its organization in Boston, its birthplace, in August, 1898. This letter had been considered by the Executive Committee, who advised that this Society unite with the Society of Natural History in the invitation to the Association for the Advancement of Science. On motion of Nathaniel T. Kidder, it was voted that this Society do so unite.

On motion of William C. Strong, it was

Voted, That the President be authorized to offer the use of our Hall to the American Association for the Advancement of Science.

for the purpose of holding its meetings when in session in the City of Boston in 1898, in case this Society is in his opinion able to do so.

The Chair announced the following Committee, appointed by the President, agreeably to the Constitution and By-Laws, to nominate candidates for Officers and Standing Committees for the year 1898:

William H. Spooner, *Chairman.*

Benjamin M. Watson,	Patrick Norton,
Samuel Hartwell,	Azell C. Bowditch,
Benjamin P. Ware,	Charles F. Curtis.

The Chairman announced the receipt of a letter from Mary Yale Eliot, acknowledging the receipt of the memorial of her late husband, Charles Eliot, and expressing her high sense of its value, and also a letter from Robert Milligan Hogg, of London, of similar tenor, in reply to a letter written by the President and Secretary of this Society, agreeably to the vote of the Society at the April meeting, expressing the Society's sense of the loss sustained in the decease of its Corresponding Member, Dr. Robert Hogg.

The decease of Hon. Joseph S. Fay, an Honorary Member of the Society, was announced, and Dr. Henry P. Walcott, E. W. Bowditch, and Walter Hunnewell were appointed to prepare a memorial of him.

The decease of Robert Douglas, of Waukegan, Ill., a Corresponding Member of the Society, was announced, and Charles S. Sargent, J. W. Manning, and James H. Bowditch were appointed a Committee to prepare a memorial.

The following vote, moved by Joseph H. Woodford, was passed:

Voted, That the Secretary write to J. G. Barker, requesting him to send warrants, signed by him, to the Treasurer, for payment of services by his Committee.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

Osborn B. Hall, of Malden,
Frederick W. Damon, of Arlington,
George H. Braman, of Newton,
Wilfred Wheeler, of Concord,
Dr. Mary E. Jones, of Boston.

On recommendation of the Executive Committee,

Hon. James Wilson, Secretary of Agriculture, Washington, D.C., was elected an Honorary Member of the Society, and

J. W. Hoffman, Ph.D., Director of the Department of Agricultural Biology and Chemistry in Tuskegee Normal and Industrial Institute, Tuskegee, Alabama, was elected a Corresponding Member.

Adjourned to Saturday, September 4.

BUSINESS MEETING.

Saturday, September 4, 1897.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

William H. Spooner, Chairman of the Committee appointed at the July meeting to nominate candidates for Officers and Standing Committees for the year 1898, reported a printed list, which was accepted. It was voted that the Committee be continued, and requested to nominate candidates to fill any vacancies that might occur before election.

The following memorial of Hon. Joseph S. Fay, prepared by the Committee appointed for that purpose at the July meeting, was presented and adopted:

Hon. Joseph Story Fay, an Honorary Member of the Massachusetts Horticultural Society, died at Boston on the 14th of June, 1897.

Many years ago he began, at his seaside home at Wood's Holl, the tree plantations which made him one of our earliest and most successful leaders in the reforesting of the denuded areas of the State.

In the later years of his life he entered the lists at the exhibitions in this Hall with specimens of fruits, flowers, and vegetables which fairly earned an unusual number of our highest prizes.

Beyond these successes, however, were those personal qualities which will attach to his memory the lasting sentiments of gratitude and respect of so many persons.

An appropriate permanent memorial of him exists in the seventy acres of charming natural scenery in the town of Falmouth, given by him to the people as a continued place of recreation, and happily named by him "Goodwill Park."

The multitudes that he made partners with him in all the attractions of his beautiful garden at Wood's Holl will long remember the kindly presence of one who found the keenest enjoyments of his life in sharing his own possessions with his less fortunate neighbors.

HENRY P. WALCOTT,
WALTER HUNNEWELL, } *Committee.*

The decease of Samuel R. Payson, an Honorary Member of the Society, and that of Edwin W. Buswell, for many years Treasurer of the Society, was announced, and it was voted that the President appoint Committees to prepare memorials of these two members.

Adjourned.

BUSINESS MEETING.

SATURDAY, October 2, 1897.

A Stated Meeting of the Massachusetts Horticultural Society, being the Annual Meeting for the choice of Officers and Standing Committees, was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The Secretary stated that the meeting had been duly called agreeably to the Constitution and By-Laws.

Agreeably to the Constitution and By-Laws, the President appointed Hon. Aaron Low, James Comley, and J. W. Manning a Committee to receive, assort, and count the votes given, and report the number. The polls were opened at five minutes past eleven o'clock.

The President, as Chairman of the Executive Committee, made the following report:

At a regular meeting of the Executive Committee, held September 25, it was voted to recommend to the Society to transfer $30 of the appropriation for the Fruit Committee for 1896 to the account of the Flower Committee for the same year, to make up for a deficiency in the amount at the command of the latter.

The transfer was unanimously authorized.

The following memorial of Robert Douglas, drawn up by Charles S. Sargent, Chairman of a Committee appointed at the July meeting for that purpose, was read and unanimously adopted:

Robert Douglas was born at Gateshead, near Halifax, England, in 1813, and removed to Canada in 1836. Two years later he settled in Whitingham, Vt., where for a short time he kept the country inn, and in 1844 he made his home on the shores of Lake Michigan, about thirty miles north of Chicago, in what is now the city of Waukegan. Here, a few years later, having been interested in the cultivation of plants since he was a boy, when he lived with his parents in Fallon's Nursery, near Newcastle, he established a small nursery business and found his true occupation; and here, during the remainder of his life, he devoted himself to raising conifer and other tree seedlings, of which he has distributed millions through the country. More recently Mr. Douglas made, under contract, successful plantations of forest trees in the western prairies, and in his time no one has been more active in increasing the love of planting trees in this country, or has studied trees from a cultural point of view with greater zeal, intelligence, or success. The integrity and purity of the life of Robert Douglas, his total lack of self-seeking, and his unfailing cheerfulness commanded the respect and affection of all who knew him.

CHARLES S. SARGENT,
J. W. MANNING,
JAMES H. BOWDITCH,
} *Committee.*

The Secretary read a letter from Joseph S. Fay, Jr., acknowledging, in behalf of his family, the memorial of his father adopted at the last meeting of the Society, and thanking the Society for it.

The following vote, offered by Hon. Aaron Low, was unanimously passed:

Voted, That the several committees be required to hold official meetings to arrange a list of prizes to be presented to the Committee on Establishing Prizes to be offered by the Society.

The Committee provided for at the last meeting of the Society to prepare a memorial of the late Samuel R. Payson was announced by the President as follows: Benjamin C. Clark, William H. Spooner, and Walter Hunnewell.

And the Committee to prepare a memorial of Edwin W. Buswell as follows: E. W. Wood, Samuel Hartwell, and George E. Davenport.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

WILLIAM H. BURLEN, of Boston,
WILLIAM J. KENNEDY, of Brighton,
MARCELLUS A. PATTEN, of Tewksbury,
EDWARD A. WILKIE, of Newtonville,
GEORGE E. FRANCIS, M.D., of Worcester,
ARTHUR F. ESTABROOK, of Boston,
JAMES O. HALE, of Byfield,
WILLIAM S. BRIGGS, of Lincoln,
Mrs. F. A. (SARAH C.) PIERCE, of Brookline,
ISAAC SPRAGUE, of Wellesley Hills.

The polls were closed at five minutes past one o'clock, and the Committee to receive, assort, and count the number given reported the whole number of ballots cast to be fifty-five, and that the members named on the ticket reported by the Nominating Committee had a plurality of votes and were elected.

The report of the Committee was accepted, and the persons named on the above mentioned ticket were, agreeably to the Constitution and By-Laws, declared by the Chairman, O. B. Hadwen (the President having retired and called Mr. Hadwen to the chair) to have a plurality of votes, and to be elected Officers and Standing Committees of the Society for the year 1898.

Adjourned to Saturday, November 6.

BUSINESS MEETING.

SATURDAY, November 6, 1897.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following memorial of Samuel R. Payson was read by Benjamin C. Clark, Chairman of the Committee appointed at the meeting on Saturday, September 4, to prepare an expression of the feelings of the Society on his death:

SAMUEL R. PAYSON.

The Massachusetts Horticultural Society desires to place upon its records a deep-felt expression of its sense of loss in the decease of Mr. Samuel R. Payson, one of its oldest, most useful, and most honored members.

Mr. Payson was a many sided man, a most eminent and public spirited Boston merchant, and a true Christian gentleman. His leading characteristics were thoroughness, capacity, benevolence, and integrity. Familiar to an unusual degree with all his vast collection of fruits and plants, it was his pleasure conscientiously and generously to share with the public his enjoyment of them.

When called upon to bear heavy pecuniary losses through the fault of others, he patiently submitted, and disaster only seemed, in his case, to prove a stimulus to efforts which ultimately resulted in the full discharge of every obligation.

Faithful in the discharge of every duty, diligent in business, combining great sagacity with incorruptible integrity and an uprightness which never wavered, aiding always in promoting the aims and objects of our Society, he has gone to his rest in the fulness of years, leaving a memory which will be most cherished by those who knew him best and longest.

BENJ. C. CLARK,
WM. H. SPOONER,
WALTER HUNNEWELL, } *Committee.*

The memorial was unanimously adopted.

The President, as Chairman of the Executive Committee, reported from that Committee a recommendation that the Society appropriate the following named sums for Prizes and Gratuities

for the year 1898, the total being the same as the present year, viz.:

For Prizes and Gratuities:

For Plants	$2,000
" Flowers	2,668
" Fruits	1,732
" Vegetables	1,200
" Gardens	500
Total for Prizes and Gratuities for the year 1898	$8,100

The report was accepted, and, agreeably to the Constitution and By-Laws, was laid over until the first Saturday in January.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

EDWARD O. ORPET, of South Lancaster,
EDWARD D. BLAKE, of Boston,
HERBERT DUMARESQ, of Chestnut Hill.

Adjourned to Saturday, December 4.

BUSINESS MEETING.

SATURDAY, December 4, 1897.

An adjourned meeting of the Society was holden today at eleven o'clock. Neither the President nor either of the Vice-Presidents being present, the meeting was called to order by the Secretary, and SAMUEL HARTWELL was unanimously elected Chairman *pro tem.*

E. W. Wood, Chairman of the Committee appointed at the October meeting to prepare a memorial of Edwin W. Buswell, presented the following:

Every year the Society is called to record the death of members who have been active in promoting its interests, and the present year has proved no exception.

Edwin William Buswell was born April 25, 1813, and died

August 5, 1897. He held for a number of years important offices of the Society, and discharged his duties in an efficient and acceptable manner. He was passionately fond of flowers, and previously to his connection with the Society, while engaged in mercantile pursuits, he devoted his leisure hours to their cultivation.

He was elected a member of the Society in 1856. He was elected a member of the Flower Committee from 1861 to 1866, serving two years as Chairman. In August, 1866, he was elected Treasurer of the Society, and he also discharged the duties of Librarian and Corresponding Secretary. In these positions he found a congenial field of labor. Not only members of the Society, but strangers visiting the Library seeking information, were pleasantly entertained and assisted in securing the information desired. He continued in the faithful discharge of his various duties until he tendered his resignation, June 2, 1881. He then removed to Brooklyn, N.Y., where he continued to reside until his death. He spent much of his time with his horticultural friends in the vicinity, many of whom expressed surprise at the extent and accuracy of his knowledge of the nomenclature of the plants in cultivation.

Resolved, That in the death of Mr. Buswell the Society loses one among its oldest members, who spent the best years of his life in its service.

Resolved, That this action of the Society be placed upon its records, and that a copy be sent to the family of the deceased.

E. W. Wood,
George E. Davenport,
Samuel Hartwell,
} *Committee.*

The memorial was unanimously accepted and adopted.

E. W. Wood, Chairman of the Fruit Committee, read the Annual Report of that Committee, which was accepted and referred to the Committee on Publication.

J. Woodward Manning, from the Committee on Establishing Prizes, reported the Schedule of Prizes for 1898 prepared by the Committee, and stated the principal changes from the Schedule of the present year. The report was accepted, and the Schedule as reported was adopted as the Schedule of Prizes for 1898.

Mr. Manning also submitted the following further report:

It is the sense of the Committee on Establishing Prizes that there should be a Committee appointed annually for the purpose of awarding prizes and gratuities to exhibits of a strictly botanical character, such as Native Plants exhibits, such committee to have similar powers and to be guided by similar rules to those which now guide the Committee on School Gardens and Children's Herbariums, and to be allowed a separate appropriation.

After remarks by George E. Davenport, Robert Manning, J. H. Woodford, and J. Woodward Manning, on the importance which the work of the Committee on School Gardens, etc., has attained and the widespread interest which it has excited, and other points, the report was laid on the table.

On motion of Azell C. Bowditch, it was voted that the thanks of the Society be presented to Charles A. Read, Jr., for his kind and generous offer of Prizes for Orchard Houses, and that it be accepted.

The Librarian laid before the Society a copy of "A Traveller's Notes of a Tour through India, Malaysia, Japan, Corea, the Australian Colonies, and New Zealand during the Years 1891–1893," by James Herbert Veitch, F.L.S., F.R.H.S., printed for private circulation and presented by the author. It was voted that the thanks of the Society be presented to Mr. Veitch for this interesting and valuable addition to the Library.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

EDMUND M. WOOD, of Natick,
JAMES W. NELSON, of Framingham,
HENRY A. WHEELER, of Newtonville,
JOHN BARR, of Wellesley,
GEORGE H. MORGAN, of New York,
J. A. PETTIGREW, of Jamaica Plain.

Adjourned to Saturday, December 18, 1897.

BUSINESS MEETING.

SATURDAY, December 18, 1897.

An adjourned meeting of the Society was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

On motion of Joseph H. Woodford, it was

Voted, That the Annual Reports of the several awarding committees, etc., be accepted and referred to the Committee on Publication, without reading.

The following named reports were then presented and so referred:

The Annual Report of the Committee on Plants, by Azell C. Bowditch, Chairman.

The Annual Report of the Committee on Flowers, by J. Woodward Manning, Chairman.

The Annual Report of the Committee on Vegetables, by Charles N. Brackett, Chairman.

The Annual Report of the Committee of Arrangements, by Joseph H. Woodford, Chairman.

The Annual Report of the Committee on the Library, by William E. Endicott, Chairman.

The Annual Report of the Secretary and Librarian, by Robert Manning, Secretary and Librarian.

The meeting was then dissolved.

REPORT

OF THE

COMMITTEE ON PLANTS,

FOR THE YEAR 1897.

By AZELL C. BOWDITCH, CHAIRMAN.

The exhibitions of plants during the past season have been fully equal, and in many respects superior, to those of the preceding year. They have attracted many new exhibitors, and the specimens offered have shown a marked improvement, especially in Orchids.

Many new plants have been brought to our notice which will be mentioned farther on. The public have taken a greater interest in the exhibitions through the season, as manifested by the increased attendance, the amateur and the beginner having a fine chance to study and compare varieties and acquire knowledge not otherwise attainable.

The display of Azaleas has not been as good as your Committee could have wished, but, by doing away with the restrictions on the size of the pots, we hope in the future to get exhibits more worthy of the premiums offered. James Wheeler has entered for the Prospective Prize a fine white Azalea, named Mrs. J. H. White, of which your Committee think favorably; if on further trial it should bear out its good points, it will be quite an acquisition.

The first prize exhibition was on January 9, when John L. Gardner, Mrs. B. P. Cheney, and others showed some fine plants of an improved strain of the Chinese Primula. Your Committee hope, by removing the restrictions as to the size of pots, to have the coming season much larger and finer plants.

John L. Gardner exhibited *Primula stellata* for the first time. Your Committee think this will prove a valuable acquisition, owing to its long keeping qualities; it lasts two or three weeks after being cut. It was awarded a First Class Certificate of Merit.

January 16. Eight varieties of Cypripedium were shown by Oakes Ames. Among them was C. Susan Ames, which was awarded Honorable Mention. Mr. Ames exhibited also a fine plant of *Scuticaria Steelii*, the shoestring Orchid. C. E. Richardson brought a plant of *Senecio Petasitis*.

January 23. J. S. Bailey showed plants of the semi-double Cyclamen. Your Committee do not think this will prove to be a very valuable acquisition, the petals being not well developed, but curly, and conveying the appearance of a badly shaped flower.

January 30. We had from William Wallace Lunt a seedling Cypripedium bearing his name, a beautiful specimen. J. H. Hemingway, gardener to F. E. Simpson, brought some fine Violets.

February 6. From George McWilliam came two seedling Cymbidiums, having *eburneum* and *Lowianum* as parents, for which a First Class Certificate of Merit was awarded. He also exhibited four seedling Cypripediums. Mr. McWilliam has been a close student, and has met with marked success in hybridizing, as the above mentioned seedlings testify. Mrs. J. C. Whiton sent two baskets of *Dendrobium nobile*. J. E. Rothwell showed five varieties of Cypripediums, and John L. Gardner two plants of Sophronitis.

SPRING EXHIBITION.

March 23, 24, 25, and 26.

The Spring Exhibition tested the capacity of our halls, and certainly there has never been a finer display of bulbous plants. Among the larger contributors were the Bussey Institution, Dr. C. G. Weld, John L. Gardner, J. W. Howard, and Warren Ewell & Son. The prizes have been somewhat altered, as will be seen by referring to the Schedule for 1898.

May 15. R. & J. Farquhar exhibited a new bedding Begonia, *B. erecta compacta multiflora*, which in the opinion of your Committee will prove worthy of cultivation. J. E. Rothwell showed a fine plant of *Cypripedium bellatulum*, with ten flowers.

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 AND 23.

E. V. R. Thayer made a beautiful display of Orchids in variety, for which the first prize was awarded, W. P. Winsor taking the second. W. A. Manda, of South Orange, N. J., contributed a new hybrid Laelio-Cattleya, variety Superba, which was most remarkable for its brilliant coloring.

July 31. There came from the estate of Joseph S. Fay four very fine plants of *Hydrangea cyanoclada hortensia*, which for profusion of bloom and symmetry of plants have not been excelled.

August 21. J. E. Rothwell was awarded a Silver Medal for Cypripedium Frau Ida Brandt, the first time exhibited.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 1 AND 2.

The Annual Exhibition of Plants again demonstrated the fact that the Society has far outgrown the capacity of our halls. The collections of Greenhouse Plants were exceedingly fine and well grown. J. S. Bailey carried off the first prize, followed by John L. Gardner, N. T. Kidder, and Dr. C. G. Weld. J. H. White had about twenty specimens of Fuchsias, for which the first prize was awarded. William Donald had a superb plant of *Alocasia Sanderiana;* he was awarded a Silver Medal for its superior cultivation.

CHRYSANTHEMUM EXHIBITION.

NOVEMBER 2, 3, 4, AND 5.

The Plant Department of the Chrysanthemum Exhibition the past season had not as many contributors as in former years, but excelled all previous efforts in quality; the plants had a more even look, but would have been much finer could the exhibition have taken place one week later. The Committee have made some changes in the Schedule for the coming year which they hope will induce more growers to compete, and thus add to the appearance of the exhibition. Among the larger contributors, N. T. Kidder was first and Mrs. B. P. Cheney a close second, followed by J. S. Bailey and others.

J. S. Bailey also contributed a fine collection of Orchids.

December 4. F. L. Harris, gardener to H. H. Hunnewell, exhibited a fine plant of Begonia Gloire de Lorraine, for which a Silver Medal was awarded. Too much cannot be said of this beautiful plant; as a house plant it will prove a valuable acquisition, being in flower nearly all the time. Its culture will certainly well repay any one who has a love for house plants.

On this day, and also on the eleventh, Hon. C. G. Roebling, of Trenton, N.J., exhibited some fine specimens of Cypripediums, especially *C. Leeanum Clinkaberryanum*, a garden variety, which was quite distinct and beautifully marked. A Silver Medal was awarded for each of these exhibits.

Amount appropriated		$2,000 00
Awarded in Premiums and Gratuities .	$1,811 00	
Thirteen Silver Medals	65 00	
		1,876 00
Balance unexpended		$124 00

All of which is respectfully submitted.

A. C. Bowditch,
A. H. Fewkes,
James Comley,
William J. Martin,
Committee on Plants.

PRIZES AND GRATUITIES AWARDED FOR PLANTS.

1897.

January 9.

Chinese Primroses. — Six plants, in six-inch pots, John L. Gardner,	85 00
Second, Mrs. Benjamin P. Cheney	4 00
Third, Mrs. Benjamin P. Cheney	3 00
Gratuity: —	
John L. Gardner, Display of Orchids	5 00

January 16.

Gratuity: —	
Charles E. Richardson, *Senecio Petasitis*	2 00

February 6.

Freesias. — Six pots or pans, Bussey Institution	5 00
Gratuities: —	
Mrs. J. C. Whiton, two baskets of Dendrobiums	3 00
James E. Rothwell, Cypripediums	1 00
John L. Gardner, Sophronitis	1 00

March 13.

Gratuity: —	
James Comley, Large Azalea	5 00

SPRING EXHIBITION.

March 23, 24, 25, and 26.

Theodore Lyman Fund.

Indian Azaleas. — Four distinct named varieties in not exceeding ten-inch pots, Dr. C. G. Weld	12 00
Second, Bussey Institution	10 00
Two distinct named varieties in not exceeding ten-inch pots, Dr. C. G. Weld	6 00
Second, Bussey Institution	4 00
Specimen Plant, named, Dr. C. G. Weld	10 00
Second, Bussey Institution	8 00
Third, James Comley	5 00

Society's Prizes.

Orchids. — Three plants, John L. Gardner	10 00
Hardy Orchids. — Collection in pots or pans, forced, not less than four species, John L. Gardner	6 00
Stove or Greenhouse Plants. — Specimen in bloom other than Azalea or Orchid, Dr. C. G. Weld	8 00
Second, J. W. Howard	6 00

HARD-WOODED GREENHOUSE PLANTS. — Four, in bloom, Dr. C. G. Weld $10 00
Second, Dr. C. G. Weld 8 00
HYBRID PERPETUAL ROSES. — Forced, six plants, not less than three distinct varieties, Charles H. Souther 10 00
Second, James Comley 8 00
CLIMBING ROSE, CRIMSON RAMBLER. — Specimen plant, in bloom, Jackson Dawson 8 00
Second, Charles J. Dawson 6 00
HARDY FLOWERING DECIDUOUS SHRUBS, FORCED. — Four, of four distinct species, named, Bussey Institution 6 00
Second, Bussey Institution 4 00
HARDY FLOWERING EVERGREEN SHRUBS, FORCED. — Four, of four distinct species, named, Bussey Institution 6 00
CANNAS. — Display in pots, the second prize to James L. Little . 8 00
HARDY PRIMROSES AND POLYANTHUSES. — Twelve plants of distinct varieties, John L. Gardner 8 00
Second, John L. Gardner 6 00
Third, James L. Little 4 00
AURICULAS. — Six, in pots, Dr. C. G. Weld 6 00
CYCLAMENS. — Ten plants, Mrs. Benjamin P. Cheney 15 00
Second, Mrs. Benjamin P. Cheney 12 00
Third, Nathaniel T. Kidder 10 00
Fourth, George M. Anderson 8 00
Ten plants, in not over seven-inch pots, Mrs. Benjamin P. Cheney, 8 00
Second, Nathaniel T. Kidder 6 00
Third, Mrs. Benjamin P. Cheney 4 00
Single plant, E. S. Converse 5 00
Second, Nathaniel T. Kidder 4 00
Third, Mrs. Benjamin P. Cheney 3 00
CINERARIAS. — Six varieties, Jason S. Bailey 10 00
Second, George M. Anderson 8 00
Third, John L. Gardner 6 00
Fourth, Dr. C. G. Weld 5 00
Three varieties, Jason S. Bailey 6 00
Second, George M. Anderson 5 00
Third, E. S. Converse 4 00
Single plant, Jason S. Bailey 4 00
Second, H. H. Rogers 3 00
Third, H. H. Rogers 2 00
HYACINTHS. — Twelve distinct named varieties in pots, one in each pot, John L. Gardner 8 00
Second, Bussey Institution 6 00
Third, Dr. C. G. Weld 4 00
Six distinct named varieties in pots, one in each pot, Dr. C. G. Weld 5 00
Second, Bussey Institution 4 00
Third, E. S. Converse 3 00

Three distinct named varieties in pots, one in each pot, Dr. C. G. Weld	$3 00
Second, Bussey Institution	2 00
Third, J. W. Howard	1 00
Single named bulb, in pot, Bussey Institution	2 00
Second, John L. Gardner	1 00
Three pans not to exceed twelve inches, ten bulbs of one variety in each pan, Dr. C. G. Weld	8 00
Second, Bussey Institution	6 00
Third, John L. Gardner	4 00
Two pans not to exceed twelve inches, ten bulbs of one variety in each pan, John L. Gardner	6 00
Second, Bussey Institution	4 00
Third, Dr. C. G. Weld	3 00
Single pan not to exceed twelve inches, ten bulbs of one variety, Dr. C. G. Weld	4 00
Second, John L. Gardner	3 00
Third, Bussey Institution	2 00
Tulips. — Six eight-inch pans, nine bulbs of one variety in each, W. S. Ewell & Son	4 00
Second, Dr. C. G. Weld	3 00
Third, W. S. Ewell & Son	2 00
Three eight-inch pans, nine bulbs of one variety in each, W. S. Ewell & Son	3 00
Second, Bussey Institution	2 00
Third, Bussey Institution	1 00
Three ten-inch pans, twelve bulbs of one variety in each, Dr. C. G. Weld	5 00
Second, Dr. C. G. Weld	4 00
Third, James L. Little	3 00
Fourth, Bussey Institution	2 00
Polyanthus Narcissus. — Four seven-inch pots, five bulbs in each, distinct varieties, Dr. C. G. Weld	6 00
Second, Dr. C. G. Weld	4 00
Third, Bussey Institution	3 00
Jonquils. — Six pots or pans, not exceeding eight inches, the number of bulbs in each to be at the discretion of the grower, W. S. Ewell & Son	4 00
Second, W. S. Ewell & Son	3 00
Third, Bussey Institution	2 00
Narcissuses. — Six eight-inch pans, distinct varieties, single or double, Dr. C. G. Weld	5 00
Second, W. S. Ewell & Son	4 00
Three eight-inch pans, W. S. Ewell & Son	4 00
Second, Dr. C. G. Weld	3 00
Lilium Longiflorum. — Six pots, not exceeding ten inches, J. W. Howard	10 00

LILIUM HARRISII. — Six pots, not exceeding ten inches, Dr. C. G. Weld $10 00
Second, J. W. Howard 8 00
LILY OF THE VALLEY. — Six pots, not exceeding seven inches, Bussey Institution 4 00
Second, Bussey Institution 3 00
Third, W. S. Ewell & Son 2 00
ANEMONES. — Three pots or pans, Bussey Institution . . . 3 00
FREESIAS. — Six pots or pans, James L. Little 4 00
Second, Dr. C. G. Weld 3 00
Third, Bussey Institution 2 00
IXIAS AND TRITONIAS. — Six pots or pans in varieties, Dr. C. G. Weld 4 00
Second, Dr. C. G. Weld 3 00
ROMAN HYACINTHS. — Six eight-inch pans, ten bulbs in a pan, W. S. Ewell & Son 4 00
Second, W. S. Ewell & Son 3 00
Third, Dr. C. G. Weld 2 00
GENERAL DISPLAY OF SPRING BULBS. — All classes, Bussey Institution 15 00
Second, J. W. Howard 12 00
Third, W. S. Ewell & Son 10 00

Gratuities: —

James Comley, Display of Azaleas 5 00
Bussey Institution, " " 3 00
George M. Anderson, Display of Cyclamens 5 00
H. H. Rogers, Display of Cyclamens and Cinerarias . . . 6 00
W. S. Ewell & Son, Display of Crocuses 2 00

MAY EXHIBITION.

MAY 1.

PELARGONIUMS. — Six pots or pans of Ivy-Leaved, in bloom, the second prize to Dr. C. G. Weld 5 00
INDIAN AZALEAS. — Six plants, in pots, named, Dr. C. G. Weld . 15 00
Single specimen, Dr. C. G. Weld 5 00
Second, Dr. C. G. Weld 4 00
CALCEOLARIAS. — Six varieties in pots, Jason S. Bailey . . . 8 00
Second, Mrs Benjamin P. Cheney 7 00
Third, " " " 5 00
Fourth, " " " 4 00
Single plant, Jason S. Bailey 3 00
Second, Mrs. Benjamin P. Cheney 2 00
Third, " " " 1 00
STREPTOCARPUSES. — Twelve in not exceeding six-inch pots, Mrs. Benjamin P. Cheney 3 00
Second, Mrs. Benjamin P. Cheney 2 00

Gratuities : —

Dr. C. G. Weld, Display of Seedling Amaryllises	$5 00
Dr. C. G. Weld, Boronias and Saintpaulia	3 00
Charles H. Souther, Calceolarias	3 00

MAY 15.

Gratuities : —

Walter Hunnewell, *Hydrangea Otaksa*	2 00
Edward J. Mitton, *Saxifraga sarmentosa*	1 00

MAY 22.

Gratuity : —

James Comley, *Cattleya Gaskelliana*	1 00

RHODODENDRON SHOW.

JUNE 3 AND 4.

Gratuities : —

William Wallace Lunt, *Cattleya Reineckiana*	1 00
John L. Gardner, Display of Orchids	10 00
Nathaniel T. Kidder, Display of Pelargoniums	6 00

ROSE EXHIBITION.

JUNE 22 AND 23.

ORCHIDS. — Six plants of six named varieties in bloom, E. V. R. Thayer	25 00
Second, W. P. Winsor	15 00
Three plants, John L. Gardner	15 00
Second, W. P. Winsor	10 00
Single specimen, Kenneth Finlayson	8 00
Second, John L. Gardner	6 00
TUBEROUS BEGONIAS. — Six pots of six varieties, Edward J. Mitton,	6 00

Gratuity : —

Nathaniel T. Kidder, Bougainvillea	5 00

JUNE 26.

Gratuity : —

E. S. Converse, *Begonia erecta*	4 00

JULY 10.

Gratuity : —

Jason S. Bailey, *Cœlogyne Massangeana*	2 00

JULY 17.

Gratuity : —

Mrs. Arthur W. Blake, Hydrangeas	10 00

JULY 24.

Gratuity : —

James E. Rothwell, Display of Orchids $4 00

JULY 31.

Gratuities : —

Estate of Joseph S. Fay, Hydrangeas 20 00

Nathaniel T. Kidder, *Aërides odorata* 5 00

AUGUST 21.

OUVIRANDRA FENESTRALIS. — E. S. Converse 8 00

Second, John L. Gardner 6 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 1 AND 2.

PALMS. — Pair in pots or tubs not more than twenty-four inches in diameter, Joseph H. White 12 00

Second, John L. Gardner 8 00

Pair in pots not more than fourteen inches in diameter, Dr. C. G. Weld 8 00

Second, Joseph H. White 6 00

GREENHOUSE PLANTS. — Collection containing foliage plants of all descriptions, not to exceed forty plants, in pots or tubs, Jason S. Bailey 40 00

Second, John L. Gardner 30 00

Six Greenhouse and Stove plants of different named varieties, two Crotons admissible, Nathaniel T. Kidder 25 00

Second, Dr. C. G. Weld 20 00

Third, John L. Gardner 15 00

Single plant for table decoration, in a twelve-inch pan or basket, dressed at the base with living plants only; only one entry admissible, the second prize to E. S. Converse . . . 6 00

Third, Charles H. Souther 4 00

SPECIMEN FLOWERING GREENHOUSE PLANT. — Single named variety, Charles H. Souther 8 00

Second, James L. Little 6 00

FUCHSIAS. — Six in not over ten-inch pots, Joseph H. White . . 12 00

Second, Charles H. Souther 10 00

FLOWERING PLANTS. — Any or all classes, group arranged for effect, Joseph H. White 15 00

ORNAMENTAL FOLIAGED PLANT. — Single specimen, named, not offered in any collection, Joseph H. White 5 00

Second, Dr. C. G. Weld 4 00

Third, Nathaniel T. Kidder 3 00

CALADIUMS. — Six named varieties, Nathaniel T. Kidder . . 6 00

Second, Dr. C. G. Weld 4 00

FERNS. — Six named varieties, no Adiantums admissible, Joseph H. White $10 00
Third, Dr. C. G. Weld 6 00
Specimen other than Tree Fern, Joseph H. White . . . 4 00
Second, E. S. Converse 3 00
ADIANTUMS. — Five named varieties, Joseph H. White . . . 8 00
Second, Dr. C. G. Weld 5 00
Third, John Jeffries 4 00
LYCOPODS. — Four named varieties, Dr. C. G. Weld . . . 5 00
DRACÆNAS. — Six named varieties, Dr. C. G. Weld . . . 8 00
Second, Nathaniel T. Kidder 6 00
CROTONS. — Six named varieties in not less than eight-inch pots, Dr. C. G. Weld 10 00
CYCAD. — Single plant, named, James L. Little . . . 10 00
Second, J. W. Howard 8 00
Third, John L. Gardner 6 00
ORCHIDS. — Three plants, named varieties, in bloom, the second prize to John L. Gardner 8 00
BEGONIA REX. — Six pots of six varieties, E. S. Converse . . 6 00
Second, James L. Little 4 00
BEGONIAS. — Rex Hybrids, collection, named, James L. Little . 6 00
Second, W. S. Lincoln 4 00
CANNAS. — Collection of not less than ten named varieties, John Jeffries 10 00
Second, James L. Little 8 00
Third, J. W. Howard 6 00

Gratuities : —

Oakes Ames, *Stanhopea grandiflora* 2 00
B. Muto, Collection of Japanese Trees and Plants 20 00
Robert Cameron, Display of Plants 40 00
Joseph H. White, " " " 5 00
Dr. C. G. Weld, " " " 3 00
Charles H. Souther, " 3 00

SEPTEMBER 18.

Gratuity : —

John L. Gardner, Display 3 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 30 AND OCTOBER 1.

DECORATIVE PLANTS. — Display, not less than forty, not to exceed three feet in height, to be arranged by the Committee, William A. Bock 25 00
Second, John L. Gardner 20 00

Gratuity : —

E. S. Converse, Decorative Plants $20 00

OCTOBER 16.

Gratuities : —

John L. Gardner, Display of Orchids 6 00
James E. Rothwell, " " 4 00
Mrs. A. O. Simes, Wild Plants 1 00

OCTOBER 30.

James E. Rothwell, Display of Dendrobiums 2 00

CHRYSANTHEMUM SHOW.

NOVEMBER 2, 3, 4, AND 5.

CHRYSANTHEMUMS. — Display of twelve named plants, any or all classes, distinct varieties, Nathaniel T. Kidder . . . 50 00
Second, Mrs. Benjamin P. Cheney 40 00
Third, Jason S. Bailey 30 00
Three Japanese Incurved, Mrs. Benjamin P. Cheney . . . 10 00
Three Reflexed, Mrs. Benjamin P. Cheney 10 00
Second, Nathaniel T. Kidder 7 00
Specimen Incurved, Nathaniel T. Kidder 6 00
Second, Mrs. Benjamin P. Cheney 5 00
Third, Nathaniel T. Kidder 4 00
Specimen Reflexed, Mrs. Benjamin P. Cheney 6 00
Specimen Anemone Flowered, Nathaniel T. Kidder . . . 6 00
Second, Mrs. Benjamin P. Cheney 5 00
Third, Nathaniel T. Kidder 4 00
Specimen Pompon, Mrs. Benjamin P. Cheney 4 00
Second, Nathaniel T. Kidder 3 00
Third, Nathaniel T. Kidder 2 00
Twelve plants of twelve different varieties, grown to one stem and bloom, in not over six-inch pots, preference being given to plants not more than three feet in height, Mrs. Arthur W. Blake . 10 00
Second, Mrs. Arthur W. Blake 8 00
Third, James L. Little 6 00
Fourth, E. S. Converse 4 00
Six plants grown as above, but all of one color, red, James L. Little 5 00
Second, E. S. Converse 4 00
White, Dr. C. G. Weld 5 00
Second, James L. Little 4 00
Third, James Nicol 3 00
Pink, Dr. C. G. Weld 5 00
Second, Dr. C. G. Weld 4 00
Third, James L. Little 3 00

Yellow, Dr. C. G. Weld	$5 00
Second, Charles H. Souther	4 00
Third, James L. Little	3 00
Six of any other color, Dr. C. G. Weld	5 00
Second, Dr. C. G. Weld	4 00
Group of Chrysanthemums arranged for effect, limited to one hundred square feet, and edged with ferns or low-growing decorative plants, Mrs. Arthur W. Blake	40 00
Second, Dr. C. G. Weld	35 00
Third, John L. Gardner	30 00
Fourth, J. W. Howard	25 00
Fifth, E. S. Converse	20 00

Gratuities: —

F. E. Palmer, *Nephrolepis exaltata*	4 00
W. P. Winsor, *Cypripedium insigne*	1 00
Jason S. Bailey, Display of Orchids	10 00
Dr. C. G. Weld, Display of Plants	3 00

DECEMBER 4.

Gratuity: —

Hon. C. G. Roebling, Trenton, N.J., four varieties of Cypripediums, 3 00

SOCIETY'S SILVER MEDALS.

Spring Exhibition, March 23–26. Mrs. B P. Cheney, for Superior Cultivation of Cyclamens.

May 1. Kenneth Finlayson, for Seedling Amaryllis.

" . J. S. Bailey, for *Dendrobium nobile Baileyanum.*

May 15. J. E. Rothwell, for *Cypripedium bellatulum.*

Rose and Strawberry Exhibition, June 22 and 23. W. A. Manda, South Orange, N.J., for *Lælio-Cattleya Arnoldiana* var. *superba.*

" " " " " " J. E. Rothwell, for *Odontoglossum crispum* var. *virginale.*

" " " " " " John Mutch, for Superior Cultivation of Orchids.

July 3. J. E. Rothwell, for *Miltonia vexillaria.*

August 21. J. E. Rothwell, for Cypripedium Frau Ida Brandt.

Annual Exhibition of Plants and Flowers, Sept. 1 and 2. William Donald, for *Alocasia Sanderiana.*

" " " " " " J. E. Rothwell, for collection of Crotons.

November 20. W. W. Lunt, for *Cypripedium insigne* var. *Ernestii.*
December 4. F. L. Harris, for Begonia Gloire de Lorraine.
December 11. Hon. C. G. Roebling, Trenton, N.J., for *Cypripedium Leeanum Clinkaberryanum.*

FIRST CLASS CERTIFICATES OF MERIT.

January 9. John L. Gardner, for *Primula stellata.*
February 6. George McWilliam, for Two Seedling Cymbidiums.
April 10. J. E. Rothwell, for *Cypripedium bellatulum.*
April 10. James Wheeler, for Seedling Azalea Mrs. Joseph H. White.
May 1. Donald McRea, for Superior Cultivation of *Mimulus* (*Diplacus*) *glutinosus.*
July 31. J. E. Rothwell, for *Cypripedium Corningii.*
Annual Exhibition of Plants and Flowers, Sept. 1 and 2. Dr. C. G. Weld, for *Heliconia illustris rubicolus.*
December 4. Hon. C. G. Roebling, Trenton, N.J., for *Cypripedium Niobe superbissima.*

HONORABLE MENTION.

January 16. Oakes Ames, for Display of Cypripediums.
Spring Exhibition, March 23–26. W. A. Manda, South Orange, N.J., for New Foliage Canna.
May 15. R. & J. Farquhar & Co., for New Bedding Begonia, *Begonia erecta compacta multiflora.*
July 3. W. E. Coburn, for Pelargonium Dorothy.
Annual Exhibition of Plants and Flowers, September 1 and 2. J. E. Rothwell, for Collection of Orchids.

REPORT

OF THE

COMMITTEE ON FLOWERS,

FOR THE YEAR 1897.

By J. WOODWARD MANNING, CHAIRMAN.

Your Committee beg leave to make the following report:

The season of 1897 has brought forth a larger number of exhibitions than in the past, and has been remarkable in many respects for the quantity and quality of the flowers exhibited. The Lower Hall has been taxed to its utmost capacity on nearly every occasion when prizes have been offered for important classes of flowers. While the abnormally cool weather conditions of the early part of the summer retarded the development of the flowers, abundant later rains produced, on the whole, a greater quantity and better quality of flowers than in the past; yet in some classes this served to develop diseases to an unusual degree, this being especially true of Hollyhocks, which, presumably for this cause, were shown in scanty numbers.

Your Committee have found it necessary, in view of the continued increase of exhibits other than those for which regular prizes are scheduled, to reduce very materially the gratuities that have in the past been awarded for such outside exhibits. This experience has made it evident that it will be necessary to reduce even to a larger extent the amount of such gratuities; in fact, it seems almost necessary to award Certificates in the place of money prizes in the near future, unless a larger appropriation can be arranged.

The exhibits of Native Plants have increased in number and have taxed the capacity of the hall, especially when exhibited in

connection with the strictly horticultural exhibitions. For that reason your Committee deem it wise that special space be granted such native plant exhibits, and would suggest the use of the Upper Hall on all days when they would not interfere with business meetings or other uses. These exhibits have created a great deal of interest and form a very significant feature of the exhibitions to a large portion of the visiting public. Extension in this line would be desirable, and your Committee feel that it would be no more than right that the exhibitors should be given ample space in which to display their collections. While your Committee, with the addition of a botanical expert to its number, have found less difficulty in making awards the past season, still they deem it wise that a Special Committee should be appointed to judge the Native Plant exhibits. They being of a strictly botanical nature, it would seem that a Committee composed exclusively of botanists would be better able to judge of the comparative rarity and educational value of the exhibits than would a Committee composed chiefly of horticulturists. For that reason we would recommend that a Special Committee, working on such lines as do the present Committee on School Gardens and Children's Herbariums, be appointed with the same powers and privileges, and that a special appropriation be set aside for their use in awarding such prizes as may be scheduled and such gratuities as they may deem wise.

On January 16 Kenneth Finlayson, gardener to Dr. C. G. Weld, made a very creditable exhibition of Hippeastrums, *Erica Wilmoreana*, *Streptosolen speciosum major*, *S. Jamesonii*, *Epacris hyacinthiflora*, *Phalœnopsis Schilleriana*, and *Centropogon Lucyanus*. On the same day, Hugh Graham, of Philadelphia, Pa., exhibited a new Carnation, Victor, for which your Committee awarded Honorable Mention.

The following Saturday, January 23, H. A. Cook exhibited the new Carnation Nivea, for which a First Class Certificate of Merit was awarded.

The exhibition of Orchids on February 6 called forth a close competition, and was very creditable to the exhibitors.

February 20 *Hemerocallis aurantiaca major* was exhibited by Jacob W. Manning as a new hardy Japanese Hemerocallis or Day Lily, and received a First Class Certificate of Merit.

SPRING EXHIBITION.

March 23, 24, 25, and 26.

At this exhibition the competition for most of the prizes offered for Roses was close; the quality of the specimens has never been surpassed, and the display was in all respects extremely satisfactory. Carnations also were shown in unusual quantity and of the best quality, while Violets were shown in great abundance and perfection. James Comley exhibited a forced branch of a new variety of Japanese Flowering Cherry which was of remarkable character in its abundance of very double, pure white, pendulous flowers, hanging in clusters the length of the branch. This was very unique and was awarded a Silver Medal.

MAY EXHIBITION.

May 1.

Pansies, Narcissuses, and Tulips were at this time shown in abundance and made a most creditable display. Native Plants were first entered at this time and continued at intervals for the remainder of the year.

May 22, Carl Jurgens, of Newport, R.I., exhibited forced flowers of *Convallaria prolificans*, which attracted a great deal of attention, and for their very apparent value were awarded a Silver Medal by the Committee. At the same exhibition the Miellez Horticultural Company exhibited two vases of Lily of the Valley, which, for their superior culture, were awarded a First Class Certificate of Merit.

RHODODENDRON SHOW.

June 3 and 4.

Although the weather conditions up to this date had not been propitious, the show of Rhododendrons and Azaleas was very fine and the quality of the flowers seemed fully up to that of previous years. At this time Oriental Poppies, German Irises, and Aquilegias were shown in quantity and great variety, and of fine quality. T. C. Thurlow made a very creditable exhibit of named Hardy Trees and Shrubs, among which particular mention should be made of *Cornus florida* var. *rubra* and a choice variety of Mag-

nolias. One of the most attractive features of this exhibition was a collection of Orchids by Henry T. Clinkaberry, gardener to Hon. C. G. Roebling, of Trenton, N.J. This exhibit attracted a great deal of attention, and for its great diversity and the unique character of many of the individual flowers was deemed worthy of the Appleton Gold Medal. A First Class Certificate of Merit was also awarded the same exhibitor for the fine hybrid Orchid, Laelio-Cattleya C. G. Roebling. W. A. Manda, of South Orange, N.J., was also awarded a First Class Certificate of Merit for superior culture shown in a spike of *Laelia purpurata* var. *South Orangiensis*, and also for *Lilium longiflorum* var. *foliis alba marginata*. To James Comley, Honorable Mention was given for the new Hardy Rhododendron William Power Wilson, and a Silver Medal for the variety James Comley.

PÆONY SHOW.

JUNE 12.

In many respects this was the most remarkable exhibition of the year. The Hall was amply filled with flowers grown to the height of perfection and displayed to the best possible advantage. The beauty and development of the individual flowers gave evidence of the highest possible culture on the part of the exhibitors, while their wide range of color was full testimony to the great value of this absolutely hardy garden plant, and seemed to make manifest the immense popularity that must soon ensue for these flowers. The Kelway Silver Gilt Medal was gained by Kenneth Finlayson, gardener to Dr. C. G. Weld, while the Kelway Bronze Medal was awarded to T. C. Thurlow. A First Class Certificate of Merit was awarded to George Hollis, for the new Seedling Pæony George Washington.

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 AND 23.

The display of Roses was disappointing in many respects, owing to lack of fully developed flowers due to the cold weather and heavy rains that had occurred just previous to that date. The following Saturday, however, they were shown in ample quantity and of the highest quality.

June 22, Honorable Mention was given W. A. Manda, of South Orange, N.J., for *Lælia elegans Mandiana*, and a First Class Certificate of Merit was awarded the same person for two new Hybrid Roses, the first being a cross between *Rosa Wichuraiana* and Perle des Jardins; the second a cross between *Rosa Wichuraiana* and Madame Hoste. Both show great possibilities for future culture. A Silver Medal was awarded to M. H. Walsh for the White Rose Lilian Nordica, and on the following day a First Class Certificate of Merit was awarded to him for the new Rose Joseph S. Fay.

The display of Delphiniums on June 26 was the finest that has been made for several years past. The spikes were of perfect quality and showed great range of color. On this date Robert Cameron, gardener to the Botanic Garden of Harvard University, made a remarkable exhibit of Hardy Herbaceous Perennials, well worthy of a larger gratuity than your Committee, owing to the limited amount of the appropriation, felt able to award.

July 3, the display of Iris Kæmpferi did not compare favorably with exhibits of former years, while Shirley Poppies, English Irises, and *Lilium candidum* unfortunately had been seriously affected by bad weather and other unfavorable conditions, and were not shown at all. The display of *Campanula Medium*, however, was undoubtedly the finest that has been made in the Hall. William Thatcher, gardener to John L. Gardner, is deserving of great praise for the high character of the spikes shown. T. C. Thurlow on this date exhibited *Rhus Cotinus atropurpureus*, which was especially distinct from other types in the deeper purplish effect of its sprays of seed vessels, and which your Committee deemed worthy of a First Class Certificate of Merit. On this date also, Walter H. Cowing exhibited *Rosa lucida alba*, a pure white and very fragrant variety of our ordinary *Rosa lucida*, and for this a First Class Certificate of Merit was awarded.

July 10, Hollyhocks were not exhibited, this being due, presumably, to the ravages of the Hollyhock disease, which seems to have made serious inroads upon all those collections which in the past have contributed so effectively to our exhibitions. On that day, James Wheeler, gardener to Joseph H. White, made a remarkable display of ninety varieties of Sweet Peas, all correctly named, and displayed in such a manner as to show the comparative difference as well as the merits of each particular variety. This

exhibit was most effective and elicited a great deal of praise. William Thatcher, gardener to John L. Gardner, exhibited a new seedling Delphinium, nearly pure white, for which Honorable Mention was awarded.

The postponement of the Hollyhock prizes until July 17 did not gain the exhibits hoped for, and none were deemed worthy of the first prize.

The exhibits of Sweet Peas on July 24 were ample and well shown, although weather conditions had been somewhat disadvantageous to individual flowers. However, distinct advancement in many of the newer sorts was evident, and the coming year will, with favorable weather conditions, undoubtedly assist in producing effective exhibits in this class. At this time, James Greene, gardener to James L. Little, exhibited flowers of *Begonia Haageana* which, for their abundance and unique character, were deemed worthy of a First Class Certificate of Merit. Robert Cameron, gardener to the Botanic Garden of Harvard University, displayed fruits of *Podophyllum Emodi*, whose unique character and ornamental effect gained for them a First Class Certificate of Merit. Hardy Perennial Phloxes were not shown to as good advantage this year as in the past, owing to abundant rains, which seriously interfered with the perfection of the panicles.

August 7, the display of Annuals resulted in very close competition. A large portion of the Hall was filled and the character of the exhibits was of the best. Unfortunately Gladioli were not shown to as good advantage this year as in the past. We hope another season may bring a change in this respect. *Montbretia crocosmiflora* was shown both by the Bussey Institution and Judge C. W. Hoitt, of Nashua, N.H., and made a very interesting exhibit. This class of Hardy Bulbs should be far more widely cultivated than in the past. Its brilliancy of color, abundance of bloom, and ease of culture are valuable characteristics.

AQUATIC EXHIBITION.

August 21.

This was held in the Upper Hall, several tanks being filled to repletion, and the exhibits commanded close attention from a large number of visitors. The same day the prizes for China Asters were closely competed for by a number of exhibitors, and decided

advancement was shown in the class. At this time a Silver Medal was awarded to Henry A. Dreer, of Philadelphia, Pa., for a remarkable collection of Cannas, among which the Canna Allemania was deemed worthy of a First Class Certificate of Merit. In addition, this gentleman exhibited the new pure white Gladiolus called White Lady, for which also a First Class Certificate of Merit was awarded, and a choice collection of double and fringed Petunias was given Honorable Mention, while Nymphæa Falconeri was allotted a First Class Certificate of Merit. Honorable Mention was given George Hollis for a sport of *Vallota purpurea*, which was quite distinct in color from the ordinary type, and of larger size.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 1 AND 2.

Not for many years past has there been such an increase of exhibits of Dahlias as at this show. The quality of the blooms was indicative of careful culture on the part of the exhibitors, while the quantity was ample evidence of the esteem in which this flower is held by the public at the present time. This exhibition was in many respects a surprise. Although your Committee recognized the fact that the Dahlia is fast coming to the front again and regaining its past eminence, yet they regret to find the appropriation set aside for the special use of this class so comparatively small.

September 11, there was shown a pure white form of *Aster Novæ-Angliæ*, for which a First Class Certificate of Merit was awarded Robert Cameron, gardener at the Botanic Garden of Harvard University.

Robert Laurie, gardener to Cornelius Vanderbilt, of Newport, R.I., made a very creditable display of Fringed Tuberous Begonias. These obtained Honorable Mention.

September 18, a display of Perennial Asters called forth close competition, and the Hall was well filled. On this date also, a noteworthy collection of ornamental fruit and hardy trees was made by Jackson Dawson, Superintendent of the Arnold Arboretum.

The exhibition of Early Flowering Chrysanthemums scheduled under October 16 did not bring the competition that was expected, and although several creditable entries were made, your Committee regret that greater competition was not evident.

CHRYSANTHEMUM SHOW.

NOVEMBER 2, 3, 4, AND 5.

All things considered, this was undoubtedly the finest exhibition of Chrysanthemums ever made in our Halls. There were a greater number of entries, and the character of the flowers was seemingly perfect in all of the double blooming varieties. All the tables were closely filled, and the capacity of the Hall was taxed to its utmost. All exhibitors seemed to vie in giving their plants the highest culture. As a result, competition was extremely close and the general tone of the exhibition was immensely improved. The classes of twenty-five varieties were very closely competed for. The vases of cut blooms gave a remarkable effect upon entering the Hall, while nearly every scheduled prize was taken. As a result the surplus that would otherwise return to the Committee to help meet gratuities awarded during the year was very small, and in consequence your Committee find the appropriation nearly exhausted at the end of the year, and they cannot but reiterate the hope that a larger appropriation can be spared by the Society for the use of the Flower Committee, feeling as they do that this would enable them to award gratuities to exhibitors more nearly in proportion to the value of their exhibits. At this show, Arthur Griffin, gardener to J. J. Van Alen, of Newport, R.I., exhibited an improved strain of seedling *Begonia semperflorens* in which a great range of color was apparent. For this a Silver Medal was given.

M. H. Walsh has entered his new seedling Rose, Lilian Nordica, for the Prospective Prize.

The amount appropriated for the year 1897 was .	$2,600 00
Awards of prizes and gratuities have been made to the amount of	2,514 00
Leaving an unexpended balance of . . .	$86 00

All of which is respectfully submitted.

J. WOODWARD MANNING,
GEORGE E. DAVENPORT,
M. H. NORTON,
FREDERICK S. DAVIS,
Committee on Flowers.

PRIZES AND GRATUITIES AWARDED FOR FLOWERS.

1897.

JANUARY 2.

Gratuities : —

James Comley, Display	$5 00
Mrs. E. M. Gill, "	1 00

JANUARY 9.

CHINESE PRIMROSES. — Display of fifty or more individual blooms, Mrs. Benjamin P. Cheney	2 00
Second, I. E. Coburn	1 00

Gratuities : —

James Comley, Display of Camellias and Orchids	3 00
W. N. Craig, Vase of Cypripediums	2 00
W. N. Craig, Vase of *Freesia refracta*	1 00
Mrs. E. M. Gill, Vase of Flowers	1 00
Mrs. P. D. Richards, Display of Mosses and Ferns	2 00

JANUARY 16.

Gratuities : —

Kenneth Finlayson, Display of Flowers	3 00
James Comley, Display of Camellias	2 00

JANUARY 23.

Gratuities : —

W. E. Coburn, cut blooms of Chinese Primulas	2 00
Mrs. E. M. Gill, Display of Flowers	1 00

JANUARY 30.

Gratuities : —

Oakes Ames, Display of Flowers	3 00
James Comley, " " "	1 00

FEBRUARY 6.

ORCHIDS. — Display of named species and varieties, filling not less than twenty bottles, E. O. Orpet	15 00
Second, William Thatcher	10 00
VIOLETS. — Best collection of varieties, fifty blooms of each in a bunch, Alexander McKay	4 00
Second, Nathaniel T. Kidder	3 00
CARNATIONS. — Display of cut blooms, with foliage, not less than six varieties, William Nicholson	8 00

CAMELLIAS. — Display of named varieties, cut flowers with foliage, not less than twelve blooms, of not less than six varieties, James Comley $4 00
Second, James Comley 3 00

Gratuities: —
James Comley, Display of Flowers 3 00
Joseph J. Comley, two vases of Roses — Bride and Bridesmaid . 2 00
John L. Bird, Display of *Acacia pubescens* 1 00
Walter E. Coburn, Display of Chinese Primroses 1 00
Mrs. E. M. Gill, Display 1 00

FEBRUARY 13.

Gratuities: —
James Comley, Vase of *Cœlogyne cristata* 3 00
James Comley, Display of California Violets 1 00

FEBRUARY 20.

Gratuities: —
James Comley, Display 4 00
Oakes Ames, " 3 00
Mrs. E. M. Gill, " 1 00

FEBRUARY 27.

Gratuities: —
James Comley, Basket of Flowers and Display 3 00
Mrs. E. M. Gill, Display of Flowers 1 00

MARCH 6.

Gratuity: —
James Comley, Display 3 00

SPRING EXHIBITION.

MARCH 23, 24, 25, AND 26.

HYBRID PERPETUAL ROSES. — Twelve blooms, of not less than four distinct named varieties, David Nevins 12 00
Second, James Comley 10 00
Six blooms, not less than three named varieties, David Nevins . 6 00
Second, James Comley 5 00
Twelve blooms of Ulrich Brunner, David Nevins . . . 10 00
TENDER ROSES IN VASES. — Twelve blooms of American Beauty, F. R. Pierson & Co., Tarrytown, N.Y. 15 00
Twenty-five blooms of Bridesmaid, William H. Elliott . . . 12 00
Second, Robert McGoram 10 00
Twenty-five blooms of Meteor, F. R. Pierson & Co. . . . 12 00
Twenty-five blooms of Souvenir de Président Carnot, F. R. Pierson & Co. 12 00

Twenty-five blooms of The Bride, William H. Elliott	$12 00
Second, Robert McGoram	10 00
Twenty-five blooms of Papa Gontier, William H. Elliott	8 00
Second, William H. Elliott	6 00
Vase of fifty blooms, assorted varieties, David Nevins	20 00
CARNATIONS. — Vase of one hundred cut blooms with foliage, not less than six varieties, William Nicholson	10 00
Third, William H. Elliott	8 00
Twenty-five blooms of any named Crimson variety, William Nicholson	4 00
Twenty-five blooms of any named Dark Pink variety, William Nicholson for William Scott	4 00
Twenty-five blooms of any named Light Pink variety, William Nicholson for Daybreak	4 00
Second, Peter Fisher for Daybreak	3 00
Twenty-five blooms of any named Scarlet variety, William Nicholson for Hector	4 00
Twenty-five blooms of any named White variety, H. A. Cook for Nivea	4 00
Second, Peter Fisher for Freedom	3 00
Twenty-five blooms of any named Yellow variety, William Nicholson for Eldorado	4 00
VIOLETS. — Bunch of fifty blooms of California, David Nevins	3 00
Second, James Comley	2 00
Bunch of fifty blooms of Lady Hume Campbell, David Nevins	3 00
Second, Joseph H. White	2 00
Bunch of fifty blooms of Marie Louise, David Nevins	3 00
Second, Joseph H. White	2 00
Bunch of fifty blooms of any other variety, David Nevins for Farquhar	3 00
Second, David Nevins for Swanley White	2 00
ANTIRRHINUMS. — Display, not less than three distinct varieties, Mrs. E. M. Gill	4 00
Second, John Jeffries	2 00
CAMELLIAS. — Display of named varieties, cut flowers with foliage, not less than twenty-four blooms of not less than six varieties, Joseph H. White	4 00
Second, James Comley	3 00

Gratuities: —

David Nevins, Display of Hardy Perpetual Roses	20 00
William E. Doyle, " of Lady Hume Campbell Violets	2 00
Jason S. Bailey, " of Carnations	1 00
David Nevins, " of Orchids	1 00
James L. Little, " of Streptocarpus	1 00
James Comley, "	5 00
Mrs. E. M. Gill, "	2 00

APRIL 3.

Gratuities: —

James Comley, Display of Cut Flowers $3 00
Mrs. E. M. Gill, " " " " 1 00

APRIL 10.

Gratuity: —

James Comley, Display of Azaleas 3 00

APRIL 17.

Gratuity: —

Mrs. P. D. Richards, Display of Native Plants 1 00

APRIL 24.

Gratuities: —

Mrs. P. D. Richards, Display of Native Plants 1 00
Miss Vivien May Norris, " " " " 1 00

MAY EXHIBITION.

MAY 1.

TULIPS. — Twenty-four blooms, distinct named varieties, Bussey Institution 4 00
Second, Kenneth Finlayson 2 00

HARDY NARCISSUSES. — Collection of not less than ten named varieties of blooms, Kenneth Finlayson 5 00
Second, Bussey Institution 4 00
Third, W. N. Craig 3 00

PANSIES. — Forty-eight blooms, not less than twenty-four varieties, Hon. Joseph S. Fay 4 00
Second, Hon. Joseph S. Fay 3 00
Third, Mrs. E. M. Gill 2 00

NATIVE PLANTS. — Collection of thirty bottles of named species and varieties, one bottle of each, Mrs. P. D. Richards . . . 8 00
Second, Miss Genevieve Doran 6 00
Third, Mrs. Kate E. Parker 4 00

Gratuities: —

Bussey Institution, Display of Tulips 2 00
Hon. Joseph S. Fay, Display of Pansies 1 00
Rea Brothers, Display of Hardy Perennials 1 00
Kenneth Finlayson, Display 3 00
Mrs. E. M. Gill, " 3 00
James Comley, " 3 00
W. N. Craig, " 2 00
John Jeffries, " 1 00
Oakes Ames, " 1 00
Mrs. Kate E. Parker, Display of Native Plants 1 00

MAY 8.

Gratuities: —

James Comley, Flowering Shrubs	$3 00
Mrs. P. D. Richards, Native Plants	2 00

MAY 15.

Gratuities: —

Bussey Institution, Display of Late Tulips	3 00
Kenneth Finlayson, Tulips	2 00
Joseph S. Chase, "	1 00
James Comley, Collection	3 00
Mrs. E. M. Gill, Display	2 00
Mrs. P. D. Richards, Native Plants	3 00

MAY 22.

TREE PÆONIES. — Collection of Single and Double varieties, named, Thomas C. Thurlow	6 00
Second, James Comley	4 00
HERBACEOUS PLANTS. — Thirty bottles, Jacob W. Manning	8 00

Gratuities: —

Thomas C. Thurlow, Collection of Hardy Shrubs	5 00
Charles H. Souther, Gloxinias	2 00
Carl Jurgens, Lily of the Valley	2 00
Jacob W. Manning, Display	2 00
James Comley, "	2 00
Mrs. E. M. Gill, "	1 00
Mrs. P. D. Richards, Wild Flowers	2 00
Miss Eleanor Doran, " "	1 00
Miss Vivien May Norris, Collection of Plants	1 00

MAY 29.

Gratuities: —

H. H. Hunnewell, Display of Rhododendrons	25 00
Miss Vivien May Norris, Native Plants	2 00

RHODODENDRON EXHIBITION.

JUNE 3 AND 4.

H. H. Hunnewell Fund.

RHODODENDRONS. — Twelve distinct varieties of unquestioned hardiness, named, James Comley	20 00
Second, John L. Gardner	15 00
Six distinct varieties of unquestioned hardiness, named, Kenneth Finlayson	10 00
Second, Mrs. Arthur W. Blake	5 00
Eighteen Tender varieties, named, James Comley	10 00

Six Tender varieties, named, James Comley	$5 00
Second, John L Gardner	4 00
Three Tender varieties, named, James Comley	4 00
Second, Kenneth Finlayson	3 00
HARDY AZALEAS, FROM ANY OR ALL CLASSES. — Fifteen varieties, one vase of each, James Comley	8 00
Second, Thomas C. Thurlow	5 00
Six varieties, one vase of each, John L. Gardner	3 00
Second, James Comley	2 00
Cluster of trusses of one variety, Thomas C. Thurlow	2 00
Second, John L. Gardner	1 00

Society's Prizes.

HERBACEOUS PÆONIES. — Collection of named varieties, the second prize to Thomas C. Thurlow	4 00
GERMAN IRISES. — Twelve distinct varieties, three spikes of each, John L. Gardner	3 00
Second, Walter H. Cowing	2 00
ORIENTAL POPPIES. — Collection, named, Walter H. Cowing	3 00
Second, W. N. Craig	2 00
AQUILEGIAS. — Collection, Frederick S. Davis	3 00
Second, Kenneth Finlayson	2 00
Third, Walter H. Cowing	1 00
HARDY ORNAMENTAL TREES AND SHRUBS. — Collection of not less than thirty species and varieties, named, cut blooms or foliage, Thomas C. Thurlow	8 00
NATIVE PLANTS. — Collection of thirty bottles of named species and varieties, one bottle of each, Mrs. P. D. Richards	8 00
Second, Mrs. Kate E. Parker	6 00
Third, Miss Genevieve Doran	4 00
VASE OF FLOWERS, Mrs. E. M. Gill	4 00

Gratuities: —

H. H. Hunnewell, Azaleas and Rhododendrons	30 00
James Comley, Rhododendrons, Azaleas, etc.	20 00
Mrs. Benjamin P. Cheney, Rhododendrons, etc.	8 00
Kenneth Finlayson, Rhododendrons, etc.	5 00
Thomas C. Thurlow, Display of Azaleas and Rhododendrons	3 00
W. A. Manda, Collection of Orchids	5 00
William Nicholson, Vase of Carnations	3 00
Bussey Institution, Tulips and Irises	1 00
John Jeffries, Display	3 00
Mrs. A. D. Wood, Display	2 00
W. N. Craig, "	2 00
Mrs. E. M. Gill, "	1 00

JUNE 12.

FOXGLOVES. — Twelve spikes, Kenneth Finlayson	$3 00
Second, W. N. Craig	2 00
Third, John L. Gardner	1 00
Gratuities : —	
James Comley, Rhododendrons, Azaleas, and other Shrubs, etc.	15 00
Hon. Joseph S. Fay, Flowering Shrubs	7 00
Thomas C. Thurlow, Pæonies and Shrubs	5 00
George Hollis, Pæonies	3 00
John L. Gardner, Pæonies	2 00
Joseph S. Chase, Vase of Pæonies	1 00
W. N. Craig, Display of Carnations and Pæonies	3 00
Thomas W. Dee, Late Flowering Tulips	2 00
Mrs. E. M. Gill, Display	3 00
Mrs. P. D. Richards, Native Plants	1 00

JUNE 19.

HERBACEOUS PÆONIES. — Collection of named varieties, Double, Kenneth Finlayson	12 00
Second, Thomas C. Thurlow	10 00
Third, George Hollis	8 00
Collection of named varieties, Single, Thomas C. Thurlow	6 00
Third, George Hollis	4 00
Specimen bloom, Kenneth Finlayson, for Blanche Neige	2 00
Second, Kenneth Finlayson, for Model of Perfection	1 00
Vase of blooms, on long stems, arranged for effect, Kenneth Finlayson	8 00
Second, M. H. Walsh	6 00
Gratuities : —	
M. H. Walsh, Display of Roses and Pæonies	6 00
Charles H. Souther, Display of Pæonies	1 00
Mrs. E. M. Gill, " " "	1 00
Mrs. E. M. Gill, " " Roses	1 00
James Comley, "	10 00
Thomas C. Thurlow, "	3 00
Mrs. A. A. Johnson, "	1 00
Miss C. M. Endicott, " " Alpine Plants	2 00

ROSE EXHIBITION.

JUNE 22 AND 23.

Special Prizes, Theodore Lyman Fund.

HARDY ROSES. — Twenty-four distinct named varieties, three of each variety, Estate of Joseph S. Fay	25 00

Second, Estate of Joseph S. Fay	$20 00
Third, Miss Eleanor J. Clark, Pomfret Centre, Conn.	15 00

Society's Prizes.

Sixteen distinct named varieties, three of each variety, Kenneth Finlayson	15 00
Second, Estate of Joseph S. Fay	10 00
Twelve distinct named varieties, three of each, the second prize to the Estate of Joseph S. Fay	8 00
Six distinct named varieties, three of each, the second prize to the Estate of Joseph S. Fay	4 00
Third, Miss Eleanor J. Clark	2 00
Twenty-four distinct named varieties, one of each, the second prize to Miss Eleanor J. Clark	8 00
Third, Estate of Joseph S. Fay	6 00
Eighteen distinct named varieties, one of each, the second prize to the Estate of Joseph S. Fay	6 00
Third, Miss Eleanor J. Clark	4 00
Twelve distinct named varieties, one of each, Kenneth Finlayson	6 00
Six distinct named varieties, one of each, W. N. Craig	4 00
Second, Estate of Joseph S. Fay	3 00
Third, Kenneth Finlayson	2 00
Twenty-four blooms of Mme. Gabriel Luizet, Miss Eleanor J. Clark	8 00
Second, Estate of Joseph S. Fay	6 00
Third, Kenneth Finlayson	4 00
Six blooms of John Hopper, the second prize to Kenneth Finlayson,	2 00
Six blooms of Marquise de Castellane, the second prize to Patrick Kane	2 00
Twelve blooms of any other variety, Kenneth Finlayson	4 00
Second, W. N. Craig	3 00
Best single bloom of a variety introduced since 1893, Miss Eleanor J. Clark	3 00
Moss Roses. — Six distinct named varieties, three clusters of each, John L. Gardner	3 00
Second, Estate of Joseph S. Fay	2 00
General Display. — One hundred bottles of Hardy Roses, buds admissible, W. N. Craig	10 00
Second, Kenneth Finlayson	9 00
Third, Mrs. E. M. Gill	8 00
Fourth, Miss Eleanor J. Clark	7 00
Fifth, Estate of Joseph S. Fay	6 00
Sixth, William H. Spooner	5 00
Sweet Williams. — Thirty spikes, not less than six distinct varieties, Bussey Institution	4 00
Second, W. N. Craig	3 00
Third, Miss Mary S. Walker	2 00
Fourth, Charles H. Souther	1 00

SPANISH IRISES. — Collection, named, the second prize to the Bussey Institution	$2 00
VASE OF FLOWERS. — Best arranged, in one of the Society's glass vases, the second prize to Miss Genevieve Doran	4 00

Gratuities : —

Miss Eleanor J. Clark, Display of General Jacqueminot Roses	8 00
William H. Spooner, Display of Roses	1 00
Thomas C. Thurlow, seventy-two varieties of Pæonies	7 00
Carl Blomberg, Hardy Flowers	2 00
Rea Brothers, Hardy Perennials and Tuberous Begonias	2 00
L. W. Goodell, two tubs of Aquatics	5 00
James Comley, Display	7 00
Patrick Kane, "	3 00
Mrs. E. M. Gill, "	3 00
Nathaniel T. Kidder, "	2 00
Estate of Joseph S. Fay, "	2 00
W. N. Craig, "	1 00
William C. Winter, "	1 00
Mrs. E. A. Wilkie, "	1 00
Mrs. P. D. Richards, Native Plants	2 00

JUNE 26.

HARDY ROSES. — Collection, named, not less than twenty-five varieties, filling fifty vases, Estate of Joseph S. Fay	15 00
Second, Estate of Joseph S. Fay	10 00
Third, Kenneth Finlayson	6 00
Fourth, Estate of Joseph S. Fay	4 00
SWEET WILLIAMS. — Auricula flowered, ten spikes of ten distinct varieties, the second prize to Carl Blomberg	2 00
DELPHINIUMS. — Collection of twenty spikes, not less than five varieties, John L. Gardner	5 00
Second, Kenneth Finlayson	4 00
HERBACEOUS PLANTS. — Thirty bottles, Nathaniel T. Kidder	8 00
Second, Jacob W. Manning	6 00
Third, Rea Brothers	4 00
VASE OF FLOWERS. — Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities : —

Robert Cameron, Hardy Herbaceous Plants	10 00
W. N. Craig, Display of Roses and Sweet Williams	3 00
Edwin Sheppard, Sweet Williams	2 00
Mrs. E. A. Wilkie, Vases of Roses	1 00
Thomas Kane, Roses	1 00
John Jeffries, Pæonies	1 00

Estate of Joseph S. Fay, Display	$6 00
Estate of Joseph S. Fay, "	6 00
James Comley, "	6 00
J. Eaton, Jr., "	3 00
Mrs. E. M. Gill, "	3 00

JULY 8.

IRIS KÆMPFERI. — Fifteen varieties, three of each, John L. Gardner,	6 00
Six varieties, three of each, Miss Mary S. Walker	4 00
Second, John L. Gardner	3 00
CAMPANULA MEDIUM. — Collection, not less than twelve bottles, John L. Gardner	3 00
Second, Bussey Institution	2 00

Gratuities: —

Estate of Joseph S. Fay, Roses	7 00
Estate of Joseph S. Fay, Sweet Williams	3 00
W. E. Coburn, Sweet Williams	1 00
John L. Gardner, Delphiniums	3 00
John L. Gardner, Iris Kæmpferi	2 00
John L. Gardner, Phlox Miss Lingard	1 00
Rea Brothers, Hardy Perennials	2 00
Thomas C. Thurlow, Pæonies, etc.	2 00
James Comley, Display	5 00
Mrs. E. M. Gill, "	3 00
Mrs. A. D. Wood, "	1 00
Mrs. P. D. Richards, Native Flowers	2 00

JULY 10.

HOLLYHOCKS. — Single, twelve spikes, the second prize to John L. Gardner	3 00
NATIVE PLANTS. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each, Mrs. P. D. Richards	8 00
Second, Misses Eleanor and Mollie Doran	6 00
Third, Miss Helen M. Noyes	4 00
VASE OF FLOWERS. — Best arranged, in one of the Society's glass vases, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities: —

Joseph H. White, Display of ninety varieties of Sweet Peas	5 00
John L. Gardner, Japanese Irises	3 00
John L. Gardner, Stocks	2 00
John L. Gardner, Display of Poppies	1 00
James Comley, Japanese Irises	2 00

William H. Spooner, Rose Bardon Job	$1 00
James Comley, Display	3 00
Rea Brothers, "	2 00
W. N. Craig, "	2 00

JULY 17.

HOLLYHOCKS. — Double, twelve blooms of twelve distinct colors, the third prize to the Estate of Joseph S. Fay	3 00
Double, six blooms, of six distinct colors, the second prize to the Estate of Joseph S. Fay	2 00
Third, Estate of Joseph S. Fay	1 00
GLOXINIAS. — Twelve vases, cut blooms, three in each vase, arranged with any foliage, Kenneth Finlayson	5 00
Second, Kenneth Finlayson	4 00
Third, James L. Little	3 00
TUBEROUS BEGONIAS. — Collection, arranged with their own foliage, James L. Little	4 00
Third, E. S. Converse	2 00
HARDY AQUATIC FLOWERS. — Collection, named, Carl Blomberg	10 00
HARDY FERNS. — Display of named species and varieties, Mrs. P. D. Richards	7 00
Second, Carl Blomberg	5 00

Gratuities: —

John L. Gardner, Hardy Phlox	2 00
Rea Brothers, Hardy Perennials	1 00
Estate of Joseph S. Fay, Display	3 00
W. N. Craig, "	1 00
Mrs. E. M. Gill, "	1 00

JULY 24.

SWEET PEAS. — Display of named varieties, filling thirty vases, arranged with any foliage, Marshall B. Faxon	6 00
Second, Mrs. H. A. Jones	4 00
Display of named varieties in vases, six sprays in each vase, Joseph H. White	4 00
Second, E. A. Weeks	3 00
Third, Mrs. H. A. Jones	2 00
HERBACEOUS PLANTS. — Thirty bottles, Nathaniel T. Kidder	8 00
Second, Jacob W. Manning	6 00
Third, Carl Blomberg	4 00
VASE OF FLOWERS. — For table decoration, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities: —

Marshall B. Faxon, Display of Sweet Peas	2 00
Botanic Garden of Harvard University, Hardy Perennials	8 00

John L. Gardner, Display $3 00
James Comley, " 2 00
James L. Little, " 2 00
Mrs. A. D. Wood, " 1 00
Mrs. P. D. Richards, Native Plants 2 00
Misses Eleanor and Mollie Doran, Native Plants 1 00

JULY 31.

PERENNIAL PHLOXES. — Eighteen distinct named varieties, one spike of each, the second prize to John L. Gardner 5 00
ANTIRRHINUMS. — Display of thirty vases, three spikes in each, the second prize to John Jeffries 3 00
Third, Carl Blomberg 2 00
NATIVE FLOWERS. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each, Mrs. P. D. Richards 8 00
Second, Misses Eleanor and Mollie Doran 6 00
Third, Miss Genevieve Doran 4 00

Gratuities: —

Marshall B. Faxon, Sweet Peas 2 00
Bussey Institution, *Montbretia crocosmiflora* 1 00
J. Warren Clark, Gladioli 1 00
John L. Gardner, Display 3 00
James Comley, " 3 00
Mrs. E. M. Gill, " 1 00
Rea Brothers, " 1 00
Carl Blomberg, Display of Native Plants 2 00
John Jeffries, Native Plants 1 00

AUGUST 7.

ANNUALS. — General display, named, filling not less than one hundred and fifty bottles, John L. Gardner . . . 10 00
Second, Carl Blomberg 8 00
Third, Charles H. Souther 6 00

Gratuities: —

J. Warren Clark, Gladioli 1 00
W. N. Craig, Display 2 00
James Comley, " 2 00

AUGUST 14.

GLADIOLI. — Ten named varieties, in spikes, the second prize to John Parker 2 00
Display of named and unnamed varieties, filling one hundred vases, arranged for effect, with any foliage, J. Warren Clark, 8 00

MONTBRETIA CROCOSMIFLORA. — Display in vases, Bussey Institution	$3 00
Second, Hon. C. W. Hoitt	2 00
Gratuities: —	
W. N. Craig, Display	3 00
John Jeffries, "	2 00
John L. Gardner, "	2 00
Estate of Joseph S. Fay, "	2 00
G. A. Oliver, "	2 00
John Parker, "	1 00
Mrs. E. M. Gill, "	1 00
William C. Winter, "	1 00
H. A. Wheeler, "	1 00
Mrs. P. D. Richards, Native Plants	1 00
The Misses Doran, " "	1 00

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

AUGUST 21.

Theodore Lyman Fund.

AQUATICS. — General display of Nymphæas, Nelumbiums, Sedges, Papyrus, and other aquatic plants, arranged for effect, to include not less than twenty-five blooms of Nymphæas, Henry A. Dreer, Philadelphia	50 00
Second, Oakes Ames	30 00
Display of twelve Nymphæas and Nelumbiums, named, Oakes Ames,	10 00
ASTERS. — Large flowered of all classes, fifty vases, not less than twelve varieties, three flowers in each vase, Joseph H. White,	6 00
Second, John L. Gardner	5 00
Third, Charles H. Souther	4 00
Truffaut's Pæony Flowered, thirty blooms, not less than twelve varieties, Joseph H. White	5 00
Second, H. A. Wheeler	3 00
Victoria Flowered, thirty blooms, not less than twelve varieties, Joseph H. White	5 00
Second, John Jeffries	3 00
Pompon, twenty-four cut plants, not less than six varieties, John L. Gardner	5 00
HERBACEOUS PLANTS. — Thirty bottles, Nathaniel T. Kidder	8 00
Second, Jacob W. Manning	6 00
Third, Oakes Ames	4 00
Gratuities: —	
Botanic Garden of Harvard University, Herbaceous Plants	10 00
John L. Gardner, Asters	1 00
Henry A. Dreer, Philadelphia, Phlox	1 00

George Hollis, Display $2 00
Henry A. Dreer, " 1 00
Rea Brothers, " 1 00
John L. Gardner, " 1 00
Mrs. E. M. Gill, " 1 00
Mrs. P. D. Richards, Native Plants 1 00
Miss Helen M. Noyes, " " 1 00

AUGUST 28.

Gratuity: —
Botanic Garden of Harvard University, Display 3 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 1 AND 2.

DAHLIAS. — Show, twelve blooms, distinct named varieties, John Parker 4 00
Second, Lothrop & Higgins 3 00
Third, H. F. Burt 2 00
Fancy, twelve blooms, distinct named varieties, H. F. Burt . . 4 00
Cactus, twelve blooms, distinct named varieties, L. W. Snow . 4 00
Second, H. F. Burt 3 00
Third, H. F. Burt 2 00
Liliputian, twelve blooms, distinct named varieties, Lothrop & Higgins 4 00
Second, Lothrop & Higgins 3 00
Third, L. W. Snow 2 00
Single, twelve blooms, distinct named varieties, John Endicott & Co. 4 00
Second, John Endicott & Co. 3 00
General Display, all classes admissible, one hundred or more bottles, H. F. Burt 10 00
Second, William C. Winter 8 00
Third, Lothrop & Higgins 6 00
LILIUM LANCIFOLIUM. — Collection of named varieties, Sumner Coolidge 4 00
TROPÆOLUMS. — Display with their own foliage, filling twenty-five vases, Kenneth Finlayson 4 00
Second, James L. Little 3 00
Third, John Jeffries 2 00
MARIGOLDS. — Display of French and African, filling twenty-five vases, John L. Gardner 3 00
Second, James Comley 2 00
DOUBLE ZINNIAS. — Twenty-five flowers, not less than six varieties, E. Sheppard & Son 4 00
Second, Oakes Ames 3 00
Third, Kenneth Finlayson 2 00

NATIVE PLANTS. — Collection, not exceeding forty bottles of named species and varieties, Misses Eleanor and Mollie Doran	$8 00
Second, Mrs. P. D. Richards	6 00
Third, Miss Helen M. Noyes	4 00
VASE OF FLOWERS. — For table decoration, on the last day of the exhibition, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00
Third, Mrs. E. M. Gill	2 00
Gratuities: —	
Oakes Ames, Aquatics	10 00
L. W. Goodell, "	7 00
N. B. Shaw, Nymphæa Devoniensis	2 00
James L. Little, Begonias	2 00
C. E. Richardson, Tuberous Begonias	1 00
A. Lummus, Dahlias	1 00
James Comley, Display	4 00
L. W. Goodell, "	2 00
Mrs. E. M. Gill, "	2 00
Mrs. J. A. Cain, "	1 00

SEPTEMBER 11.

HERBACEOUS PLANTS. — Thirty bottles, Nathaniel T. Kidder	8 00
Second, Oakes Ames	6 00
Gratuities: —	
John Endicott & Co., Dahlias	1 00
James Comley, Display	3 00
Mrs. E. M. Gill, "	1 00
Miss Helen M. Noyes, Native Plants	1 00

SEPTEMBER 18.

PERENNIAL ASTERS. — Display of Native or Introduced species and varieties, Misses Eleanor and Mollie Doran	5 00
Second, Mrs. P. D. Richards	4 00
Third, John L. Gardner	3 00
ORNAMENTAL FRUITED HARDY TREES AND SHRUBS. — Collection of cut branches, named, Jackson Dawson	8 00
Second, Jackson Dawson	6 00
Gratuities: —	
Walter E. Coburn, *Aster Novæ Angliæ*	1 00
James Anderson, Display	2 00
Mrs. E. M. Gill "	2 00

SEPTEMBER 25.

Gratuity: —	
Mrs. E. M. Gill, Display	1 00

OCTOBER 9.

Gratuities : —

H. A. Wheeler, Petunias $1 00
Mrs. E. M. Gill, Display 1 00
Misses Eleanor and Mollie Doran, Display of Native Plants . . 2 00

OCTOBER 16.

CHRYSANTHEMUMS. — Six blooms, distinct named varieties, James L. Little 3 00
Second, Cornelius Vanderbilt, Newport, R.I. 2 00
Third, J. W. Howard 1 00
Ten blooms of one variety, long stemmed, in vase, Cornelius Vanderbilt 8 00
Second, Cornelius Vanderbilt 6 00
Third, J. W. Howard 4 00

Gratuities : —

J. W. Leach & Sons, Chrysanthemum Ivory 1 00
C. E. Richardson, Tuberous Begonias 1 00
James Comley, Display 2 00
Mrs. E. M. Gill, " 1 00

OCTOBER 23.

Gratuities : —

W. N. Craig, *Eucharis Amazonica* 2 00
" " " Chrysanthemums 1 00
H. A. Wheeler, " 1 00

OCTOBER 30.

Gratuity : —

Oakes Ames, Orchids 5 00

CHRYSANTHEMUM SHOW.

NOVEMBER 2, 3, 4, AND 5.

Special Prizes.

Josiah Bradlee Fund.

CHRYSANTHEMUMS. — Twenty-five blooms of twenty-five distinct named varieties, E. M. Wood & Co. 20 00
Second, Cornelius Vanderbilt, Newport, R.I. 15 00
Third, Mrs. Benjamin P. Cheney 10 00
Six vases of six named varieties, ten blooms each, E. M. Wood & Co. 30 00
Second, Mrs. Benjamin P. Cheney 25 00
Third, J. W. Howard 20 00

Society's Prizes.

Twelve cut blooms, Incurved, named, Joseph H. White	$8 00
Second, Charles H. Souther	6 00
Twelve cut blooms, Japanese, named, David Nevins	10 00
Second, Joseph H. White	6 00
Third, Nathaniel T. Kidder	4 00
Twelve cut blooms, Japanese Incurved, named, E. M. Wood & Co.	10 00
Second, Joseph H. White	6 00
Third, Mrs. Benjamin P. Cheney	4 00
Twelve cut blooms, Anemone, named, James L. Little	8 00
Second, James L. Little	6 00
Six cut blooms, Incurved, named, Joseph H. White	5 00
Second, Charles H. Souther	4 00
Third, Elijah A. Wood	2 00
Six cut blooms, Japanese, named, Charles H. Souther	6 00
Second, James L. Little	4 00
Six cut blooms, Japanese Incurved, named, Charles H. Souther	6 00
Second, James L. Little	4 00
Six cut blooms, Reflexed, named, Joseph H. White	6 00
Second, Charles H. Souther	4 00
Third, E. S. Converse	2 00
Six cut blooms, Anemone, named, E. S. Converse	5 00
Second, James L. Little	4 00
Third, J. W. Howard	2 00
Twelve sprays Pompons, not less than six named varieties, the third prize to J. W. Howard	1 00
Twelve best varieties, named, introductions of 1897, Kenneth Finlayson	8 00
Second, Mrs. Benjamin P. Cheney	6 00
Vase of ten blooms on long stems, Pink, named, C. Vanderbilt, for Interocean	10 00
Second, H. McKay Twombly, for Viviand Morel	8 00
Third, David Nevins, for Viviand Morel	6 00
Vase of ten blooms on long stems, Red, named, David Nevins, for John Shrimpton	10 00
Second, E. M. Wood & Co., for Edwin Molyneux	8 00
Third, Mrs. Benjamin P. Cheney, for John Shrimpton	6 00
Vase of ten blooms on long stems, White, named, H. McKay Twombly, for Frank Hardy	10 00
Second, E. M. Wood & Co., for Mrs. Jerome Jones	8 00
Third, Mrs. Benjamin P. Cheney, for Mutual Friend	6 00
Vase of ten blooms on long stems, Yellow, named, David Nevins, for Major Bonnafon	10 00
Second, E. M. Wood & Co., for Golden Wedding	8 00
Third, Hon. John Simpkins, for Modesto	6 00

Vase of blooms on long stems, any other color, named, H. McKay Twombly, for Silver Cloud	$10 00
Second, David Nevins, for Charles Davis	8 00
Third, Mrs. Benjamin P. Cheney, for Mrs. George West	6 00
Vase of blooms on long stems, arranged in the Society's large China vases, to be kept in good condition during the exhibition, E. M. Wood & Co.	20 00
Second, Hon. John Simpkins	18 00
Third, Miss Eleanor J. Clark	16 00
Fourth, Charles H. Souther	14 00
Fifth, David Nevins	12 00
Sixth, W. N. Craig	10 00
Seventh, J. W. Howard	8 00
Best Seedling, never disseminated, Yellow, six blooms, C. Vanderbilt, Newport, R.I., for Peter Kay	5 00
Best Seedling, never disseminated, Incurved, of any color, six blooms, Joseph H. White, for Mrs. Gertrude Brydon	5 00

Gratuities : —

Frank Jones, Display of Chrysanthemums	6 00
Mrs. E. M. Gill, Chrysanthemums	3 00
William Nicholson, Carnations and Chrysanthemums	4 00
Peter Fisher, Carnations	1 00
James Comley, Display	3 00

NOVEMBER 13.

Gratuity : —

Mrs. E. M. Gill, Chrysanthemums	1 00

SOCIETY'S SILVER MEDALS.

Spring Exhibition, March 28. James Comley, for a new variety of Japanese Flowering Cherry.

May 22. Carl Jurgens, Newport, R.I., for *Convallaria prolificans.*

Rhododendron Show, June 3. James Comley, for new hardy Rhododendron James Comley.

Rose Exhibition, June 22. M. H. Walsh, for Rose Lilian Nordica.

August 21. Henry A. Dreer, Philadelphia, for a Collection of new Cannas.

Chrysanthemum Show, November 2. J. J. Van Alen, for Hybrid *Begonia semperflorens.*

APPLETON GOLD MEDAL.

Rhododendron Show, June 3. Hon. C. G. Roebling, Trenton, N.J., for a Collection of Orchids.

APPLETON SILVER MEDAL.

December 31. N. T. Kidder, he having taken the greatest number of First Prizes for Hardy Herbaceous Perennials through the season.

" 31. Mrs. P. D. Richards, she having taken the greatest number of First Prizes for Native Plants through the season.

APPLETON BRONZE MEDAL.

December 31. Jacob W. Manning, he having taken the second greatest number of First Prizes for Hardy Herbaceous Perennials through the season.

" 31. Misses Eleanor and Mollie Doran, they having taken the second greatest number of First Prizes for Native Plants through the season.

KELWAY SILVER GILT MEDAL.

June 19. Kenneth Finlayson, for the best Collection of eighteen named varieties of *Pæonia albiflora*, single or double.

KELWAY BRONZE MEDAL.

June 19. T. C. Thurlow, for the second best Collection of eighteen named varieties of *Pæonia albiflora*, single or double.

FIRST CLASS CERTIFICATES OF MERIT.

January 23. H. A. Cook, for Carnation Nivea.

February 13. John N. May, Summit, N.J., for Carnation Lily Dean.

" 20. Jacob W. Manning, for *Hemerocallis aurantiaca major*.

April 24. F. A. Blake, Rochdale, for Seedling Carnation Bon Ton.

May 22. Miellez Horticultural Company, for Lily of the Valley.

Rhododendron Show, June 3. Hon. C. G. Roebling, Trenton, N.J., for Lælio-Cattleya C. G. Roebling.

" " " " W. A. Manda, South Orange, N.J., for *Lælia purpurata* var. *South Orangiensis*.

" " " " " " for *Lilium longiflorum foliis alba marginata*.

Pæony Exhibition, June 19. George Hollis, for Seedling Pæony George Washington.

Rose Exhibition, June 22. W. A. Manda, South Orange, N.J., for new Rose, a cross between Rosa Wichuraiana and Perle des Jardins.

" " " " for new Rose, a cross between Rosa Wichuraiana and Madame Hoste.

" " " M. H. Walsh, for Rose Joseph S. Fay.

July 3. T. C. Thurlow, for *Rhus cotinus atropurpureus*.

" " W. H. Cowing, for *Rosa lucida alba*.

" 24. James L. Little, for *Begonia Haageana*.

" " Harvard Botanic Garden, for *Podophyllum Emodi*.

August 21. Henry A. Dreer, Philadelphia, for *Nymphæa Falconerii*.

" " " " " " for Canna Allemania.

" " " " " " for Gladiolus White Lady.

September 11. Robert Cameron, for *Aster Novæ Angliæ.*
October 30. I. E. Coburn, for a Collection of Pansies.
Chrysanthemum Show, November 2. Peter Fisher, for Carnation Mrs. T. W. Lawson.
" " " " Hugh Graham, Philadelphia, for Chrysanthemum Pennsylvania.

HONORABLE MENTION.

January 16. Hugh Graham, Philadelphia, for new Carnation Victor.
April 10. F. A. Blake, for new scarlet Seedling Carnation Bon Ton.
June 8. James Comley, for new hardy Rhododendron William Power Wilson.
" 22. W. A. Manda, South Orange, N.J., for *Lælia elegans Mandiana.*
July 10. John L. Gardner, for new Seedling Delphinium.
" 31. " " " for new Seedling Delphinium.
August 21. Henry A. Dreer, Philadelphia, for Double and Fringed Petunias.
" " George Hollis, for a sport of *Vallota purpurea.*
September 11. Cornelius Vanderbilt, Newport, R.I., for Fringed Tuberous Begonias.
Chrysanthemum Show, November 2. Joseph Hilbert, Nyack, N.Y., for a sport of Swainsonia.
" " " " A. Roper, for Carnation Mayor Quincy.

COMPLIMENTARY NOTICE.

February 6. A. Roper, for new Carnation Roper's Seedling.

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1897.

By E. W. WOOD, CHAIRMAN.

The fruit crop of the present year, as indicated by our exhibitions, was below the average of the last few years. While there was no absolute failure in any particular line of fruit, the natural conditions were unfavorable for the best results. There was less injury to the peach buds and to the strawberry, raspberry, and blackberry plants than usual, but the excessive amount of moisture and the limited amount of sunshine were unfavorable to the growth and maturity of the small fruits.

It being the off year for apples, the quantity shown and the quality of the exhibits compared unfavorably with the preceding year. The constant repetition of a biennial apple crop suggests the effort to change the bearing year of a portion of the orchard, especially of the late varieties, which may be done by removing the blossoms for two or three successive bearing years on young or newly grafted trees.

Seldom, if ever, has the pear crop been more abundant, and except when carefully thinned the fruit was inferior in size and quality. There was a large quantity of pears shown at the Annual Exhibition, and while there were comparatively few specimens deserving special mention, there were fewer than usual that did not do credit to the growers and the Exhibition.

Peaches were shown in larger quantity than for several years. Some exhibits were of superior quality, while others showed unmistakable signs of being the product of diseased trees.

Plums were fairly represented. The increase in the number and quantity of Japanese varieties was especially noticeable, and they will doubtless prove a valuable addition to the list of plums heretofore under cultivation.

At the Strawberry Exhibition all popular varieties were well represented. The Marshall, as in previous years, won all the prizes where it was in competition. There has been complaint from some of the commercial growers that it has not proved sufficiently productive, while others have found it the most profitable variety they have grown. Whatever may be the final consensus of opinion as to its value as a field berry, there can be no question as to its superiority for the amateur and for exhibition. Several new seedlings were shown requiring further cultivation to establish their standing. Of recent introductions the Clyde seems to be the most popular variety. The fruit is of medium size and fair quality; the plant is a strong grower, and, as far as tested, proves remarkably productive. It will be placed on the premium list for 1898.

A pleasing and encouraging feature of our exhibitions has been the steady but constant improvement of the fruit placed on exhibition. The exhibitors are more careful in the selection and arrangement of their specimens, and where the competition is between single dishes of the same varieties there is little encouragement to compete with inferior or imperfect specimens.

Campbell's Early Grape was shown at three exhibitions, and the specimens were an improvement in appearance and quality over those exhibited last year. There were seedling apples, pears, and grapes from other States shown during the season, but the Committee could not, after careful examination, discover any single point of excellence over similar fruits already in general cultivation.

Most of our new fruits have been chance seedlings. The fruit growers have hardly kept pace with the florists in improvement by cross-fertilization, as note the improvement in the rose, chrysanthemum, and carnation within the last ten years. Cross-breeding of animals shows what may be accomplished by intelligent and persevering effort and the selection of parents with a definite object in view. Fruits and flowers seem equally susceptible of improvement by cross-fertilization.

The Committee have awarded in prizes and gratuities $1,604, leaving an unexpended balance of $196.

E. W. Wood,
O. B. Hadwen,
Samuel Hartwell,
Warren Fenno,
} *Committee.*

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1897.

SPRING EXHIBITION.

MARCH 23, 24, 25, AND 26.

WINTER APPLES. — Baldwin, J. V. Fletcher	$3 00
Second, John W. Clark	2 00
Third, Charles W. Boyden	1 00
Northern Spy, F. J. Boyden	3 00
Second, George V. Fletcher	2 00
Third, George C. Rice	1 00
Roxbury Russet, H. R. Kinney	3 00
Second, George V. Fletcher	2 00
Third, Charles C. Boyden	1 00
Tompkins King, George C. Rice	3 00
Second, F. J. Kinney	2 00
Third, Charles C. Boyden	1 00
Any other variety, George C. Rice, Yellow Bellflower	3 00
Second, George C. Rice, Palmer	2 00
Third, George V. Fletcher, Rhode Island Greening	1 00
STRAWBERRIES. — One pint, E. S. Converse	3 00
Gratuity : —	
Jackson Dawson, Strawberry plants in fruit	2 00

MAY 29.

Gratuity : —	
William Brown, Hothouse peaches	2 00

RHODODENDRON SHOW.

JUNE 3 AND 4.

Gratuity : —	
E. S. Converse, Nectarines	1 00

JUNE 12.

Gratuities : —	
Hon. Joseph S. Fay, Strawberries	2 00
W. N. Craig, "	1 00
William Doran & Son, "	1 00

JUNE 19.

Gratuity : —	
Estate of Joseph S. Fay, Strawberries	2 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 AND 23.

Special Prizes from the Theodore Lyman Fund.

STRAWBERRIES. — Four quarts of any variety, Varnum Frost, Marshall	$20 00
Second, George E. Horne, Marshall	16 00
Third, Estate of Joseph S. Fay, Marshall	12 00
Fourth, Warren Heustis & Son, "	10 00
Fifth, George V. Fletcher, "	8 00

Special Prizes offered by the Society.

Two quarts of any variety, best adapted for garden cultivation, for home use, to be judged by points, Estate of Joseph S. Fay, Marshall	6 00
Second, Warren Heustis & Son, Marshall	5 00
Third, Isaac E. Coburn, Jessie	4 00
Fourth, George V. Fletcher, Marshall	3 00

Regular Prizes.

For the largest and best collection, not less than twenty baskets of two quarts each, and not less than five varieties, George F. Wheeler	25 00
Second, I. E. Coburn	20 00
Ten baskets of two quarts each, not less than three varieties, George F. Wheeler	15 00
Second, I. E. Coburn	12 00
Five baskets, two quarts each, of one variety, George E. Horne	8 00
Two quarts of Belmont, George V. Fletcher	4 00
Second, Varnum Frost	3 00
Bubach, George E. Horne	4 00
Second, I. E. Coburn	3 00
Third, George V. Fletcher	2 00
Champion, George E. Horne	4 00
Charles Downing, Miss Mary S. Walker	4 00
Second, George F. Wheeler	3 00
Third, William Doran & Son	2 00
Crescent, George F. Wheeler	4 00
Second, I. E. Coburn	3 00
Third, Rev. C. Terry	2 00
Haverland, I. E. Coburn	4 00
Second, John C. Haskell	3 00
Third, George F. Wheeler	2 00
Hersey, George F. Wheeler	4 00
Jessie, George V. Fletcher	4 00
Second, I. E. Coburn	3 00
Third, George F. Wheeler	2 00

Leader, William Doran & Son	$4 00
Second, George F. Wheeler	3 00
Third, E. S. Converse	2 00
Marshall, Varnum Frost	4 00
Second, Estate of Joseph S. Fay	3 00
Third, George E. Horne	2 00
Miner's Prolific, Charles S. Smith	4 00
Second, George F. Wheeler	3 00
Parker Earle, I. E. Coburn	4 00
Second, George F. Wheeler	3 00
Sharpless, George E. Horne	4 00
Second, William Doran & Son	3 00
Timbrell, the second prize to William Doran & Son	3 00
Any other variety, George F. Wheeler, Enormous	4 00
Second, S. H. Warren, Clyde	3 00
Third, I. E. Coburn, Beverly	2 00
Collection, not less than six varieties, one quart each, I. E. Coburn,	8 00
Second, George F. Wheeler	6 00
One quart of any new variety, not previously exhibited, S. H. Warren, Seedling No. 3	5 00
Second, George E. Horne, Seedling	4 00
CHERRIES. — Two quarts of any variety, O. R. Robbins	4 00
Second, George V. Fletcher	3 00
Third, Edwin Hastings	2 00
FOREIGN GRAPES. — Two bunches of any variety, Joseph H. White	6 00
Second, William C. Winter	4 00
FORCED PEACHES. — Six of any variety, A. Packard	3 00
Second, William C. Winter	2 00
Gratuity: —	
Edmund Hersey, Cranberries	1 00

JUNE 26.

STRAWBERRIES. — Two quarts of any variety, Warren Heustis & Son	4 00
Second, Estate of Joseph S. Fay	3 00
Third, E. L. Smith	2 00
Gratuity: —	
Thomas Harrison, Cherries	1 00

JULY 3.

CHERRIES. — Two quarts of Black Eagle, E. S. Converse	3 00
Second, Frederick W. Damon	2 00
Third, A. F. Coolidge	1 00
Black Tartarian, George V. Fletcher	3 00
Second, Charles B. Travis	2 00
Third, Edwin Hastings	1 00

Coe's Transparent, John L. Bird $3 00
Downer, M. W. Chadbourne 3 00
Any other variety, Charles B. Travis, Elton 3 00
Second, Charles S. Smith, Governor Wood 2 00
Third, George V. Fletcher 1 00

Gratuities: —

Warren Heustis & Son, Strawberries 1 00
William C. Winter, Foreign Grapes 2 00
E. S. Converse, Peaches 1 00
William Doran & Son, Collection 2 00

JULY 10.

RASPBERRIES. — Two quarts of any variety, Benjamin G. Smith . 3 00
Second, Frederick W. Damon 2 00
CURRANTS. — Two quarts of any Red variety, W. N. Craig, Fay's . 4 00
Second, Sumner Coolidge, Fay's 3 00
Third, William Doran & Son, Versaillaise 2 00
Fourth, W. N. Craig, Versaillaise 1 00
Two quarts of any White variety, Frederick W. Damon . . 3 00
Second, Mrs. Arthur W. Blake 2 00
Third, E. S. Converse 1 00
GOOSEBERRIES. — Two quarts of any variety of American origin, Joseph S. Chase, Triumph 4 00
Second, W. N. Craig, Columbus 3 00
Third, W. G. Kendall, Chatauqua 2 00
Fourth, Starkes Whiton, Bates's Seedling 1 00

Gratuities: —

Warren Heustis & Son, Marshall Strawberries 1 00
M. W. Chadbourne, Cherries 1 00
E. S. Chapell, " 1 00

JULY 17.

RASPBERRIES. — Two quarts of any variety, Benjamin G. Smith . 3 00
Second, William Doran & Son, Franconia 2 00
Third, William Doran & Son, Antwerp 1 00
CURRANTS. — One quart of any Red variety, W. N. Craig, Versaillaise 3 00
Second, Sumner Coolidge 2 00
Third, W. N. Craig, Fay's 1 00
One quart of any White variety, Francis Blake, White Grape . 2 00
Second, George V. Fletcher, White Grape 1 00
GOOSEBERRIES. — Two quarts of any Foreign variety, Benjamin G. Smith, Hero of the Nile 4 00
Second, Benjamin G. Smith, Green Ocean 3 00
Third, Benjamin G. Smith, Ashton 2 00
Fourth, W. N. Craig, Industry 1 00

Gratuities: —

Charles S. Smith, Cherries	$1 00
Vera Chapell, "	1 00

A. H. Griesa, Lawrence, Kansas, for Superb Apricot, a First Class Certificate of Merit.

JULY 24.

BLACKBERRIES. — Two quarts of any variety, M. W. Chadbourne	3 00
Second, Nathaniel T. Kidder	2 00
APPLES. — Tetofsky, Sumner Coolidge	3 00
Second, M. W. Chadbourne	2 00
Third, Samuel Hartwell	1 00
PEARS. — Summer Doyenne, E. S. Converse	3 00
Second, Leverett M. Chase	2 00
Third, Warren Fenno	1 00
PEACHES. — Six of any variety, William C. Winter	3 00
Second, W. D. Hinds	2 00

Gratuities: —

P. Murray Winter, Seedling Gooseberry	1 00
James L. Little, Seedling Gooseberries	1 00
W. D. Hinds, Collection of Raspberries	1 00

JULY 31.

APPLES. — Red Astrachan, Frederick W. Damon	3 00
Second, William C. Winter	2 00
Third, Warren Fenno	1 00
Sweet Bough, George V. Fletcher	3 00
Second, Charles B. Travis	2 00
Third, Warren Fenno	1 00
Any other variety, Sumner Coolidge, Williams's Favorite	3 00
Second, Joshua C. Stone	2 00
PEARS. — Giffard, Rufus T. Tobey	3 00
Second, Mrs. Emmons	2 00
Third, A. T. Brown	1 00
Any other variety, Mrs. S. Klaus, Clapp's Favorite	3 00
Second, A. T. Brown " "	2 00
Third, Sumner Coolidge " "	1 00
BLACKBERRIES. — Two quarts of any variety, Sumner Coolidge	3 00
Second, M. W. Chadbourne	2 00
Third, Francis Blake	1 00
PEACHES. — Outdoor culture, any variety, William G. Prescott	3 00
Second, Francis Blake	2 00
Third, N. D. Harrington	1 00

AUGUST 7.

APPLES. — Oldenburg, J. V. Fletcher $3 00
Any other variety, Frederick W. Damon, Red Astrachan . . 3 00
Second, Warren Fenno, Red Astrachan 2 00
Third, George V. Fletcher, Sweet Bough 1 00
PEARS. — Clapp's Favorite, Mrs. S. Klaus 3 00
Second, Sumner Coolidge 2 00
Third, A. T. Brown 1 00
Any other variety, Frederick W. Damon 2 00
Second, Warren Fenno 1 00
PEACHES. — Twelve specimens of outdoor culture, any variety, George H. Sherwin, Hale's Early 3 00
Second, Charles F. Curtis, Hale's Early 2 00
Third, Francis Blake, Amsden 1 00
Six specimens, cold house or pot culture, William C. Winter . 3 00
PLUMS. — Japanese, any variety, T. A. Greenleaf, Abundance . 3 00
Second, W. D. Hinds, Burbank 2 00
Third, W. D. Hinds, Abundance 1 00
FOREIGN GRAPES. — Two bunches of any variety, Miss Eleanor J. Clark, Pomfret, Conn., Black Hamburg 5 00
Second, E. S. Converse, Syrian 4 00

AUGUST 14.

APPLES. — Summer Pippin, Samuel Hartwell 3 00
Second, Warren Fenno 2 00
Williams's Favorite, Joshua C. Stone 3 00
Second, Charles F. Curtis 2 00
Third, Sumner Coolidge 1 00
Any other variety, H. F. Tuttle, Red Astrachan 3 00
Second, Samuel Hartwell, Gravenstein 2 00
Third, Samuel Hartwell, Bietigheimer 1 00
PEARS. — Rostiezer, M. W. Chadbourne 3 00
Second, S. F. & F. L. Weston 2 00
Third, A. T. Brown 1 00
Tyson, Leverett M. Chase 3 00
Second, John L. Bird 2 00
Third, Clifford R. Weld 1 00
Any other variety, Sumner Coolidge, Clapp's Favorite . . 3 00
Second, Mrs. S. Klaus, " " . . . 2 00
Third, A. T. Brown, " " . . . 1 00
PEACHES. — Any variety, Sumner Coolidge, Early Rivers . . 3 00
Second, E. S. Converse, Royal George 2 00
Third, H. F. Tuttle, Early Rivers 1 00
PLUMS. — Japanese, any variety, William C. Winter, Abundance . 3 00
Second, W. D. Hinds, Abundance 2 00
Third, W. D. Hinds, Burbank 1 00

Gratuities: —

Joseph S. Chase, Collection of Japanese Plums	$1 00
William C. Winter, Cold House Peaches	1 00

AUGUST 21.

APPLES. — Foundling, the second prize to Warren Fenno	2 00
Gravenstein, Samuel Hartwell	3 00
Second, Warren Heustis & Son	2 00
Third, W. D. Hinds	1 00
Maiden's Blush, Warren Fenno	3 00
Second, William C. Winter	2 00
Third, Joshua C. Stone	1 00
Porter, M. W. Chadbourne	3 00
Second, Joshua C. Stone	2 00
Third, Samuel Hartwell	1 00
Any other variety, Joshua C. Stone, Williams's Favorite	3 00
Second, Samuel Hartwell, Summer Pippin	2 00
Third, W. D. Hinds, Williams's Favorite	1 00
PEARS. — Andrews, E. S. Converse	3 00
Second, Joshua C. Stone	2 00
Bartlett, William Milman	3 00
Second, Mrs. S. Klaus	2 00
Third, A. T. Brown	1 00
Souvenir du Congrès, A. T. Brown	3 00
Second, Warren Fenno	2 00
Third, M. W. Chadbourne	1 00
Any other variety, Mrs. S. Klaus	3 00
Second, J. L. Duncan	2 00
Third, A. T. Brown	1 00
PEACHES. — Collection, the third prize to W. D. Hinds	2 00
Single dish of any variety, Sumner Coolidge	3 00
Second, Francis Blake	2 00
Third, T. A. Greenleaf	1 00
PLUMS. — Bradshaw, George V. Fletcher	3 00
Second, William H. Hunt	2 00
Any other variety, Sumner Coolidge, Abundance	3 00
Second, T. A. Greenleaf, "	2 00
Third, W. D. Hinds, "	1 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 1 AND 2.

FOREIGN GRAPES. — Two bunches of Black Alicante, Miss Eleanor J. Clark, Pomfret, Conn.	5 00
Black Hamburg, Miss E. J. Clark	5 00
Second, E. S. Converse	4 00

Golden Hamburg, Miss E. J. Clark	$5 00
Lady Downes, the second prize to E. S. Converse	4 00
Muscat of Alexandria, Joseph H. White	5 00
Second, E. S. Converse	4 00
Any other variety, E. S. Converse, Blue Chasselas	5 00
Second, William C. Winter, Frontignan	4 00
Third, E. S. Converse, Red Chasselas	3 00

SEPTEMBER 4.

Gratuity : —

C. R. Safford, Crawford's Early Peaches	1 00

SEPTEMBER 11.

APPLES. — Gravenstein, Samuel Hartwell	3 00
Second, C. L. Hartshorn	2 00
Third, Charles S. Smith	1 00
Maiden's Blush, W. G. Kendall	3 00
Second, Warren Fenno	2 00
Third, H. R. Kinney	1 00
Porter, M. W. Chadbourne	3 00
Second, Frederick W. Damon	2 00
Third, Joshua C. Stone	1 00
Pumpkin Sweet, Samuel Hartwell	3 00
Any other variety, Warren Fenno, Washington Strawberry	3 00
Second, Joshua C. Stone, " "	2 00
Third, Warren Fenno, Twenty Ounce	1 00
CRAB APPLES. — Twenty-four specimens of Transcendent, Warren Fenno	2 00
Any other variety, M. W. Chadbourne, Hyslop	2 00
Second, Joshua C. Stone, Hyslop	1 00
PEARS. — Bartlett, William Milman	3 00
Second, Sumner Coolidge	2 00
Third, Mrs. S. Klaus	1 00
Belle Lucrative, Charles E. Richardson	3 00
Second, E. S. Converse	2 00
Third, A. T. Brown	1 00
Boussock, Sumner Coolidge	3 00
Second, W. H. Chipman	2 00
Third, M. W. Chadbourne	1 00
Hardy, Warren Fenno	3 00
Second, Mrs. E. M. Gill	2 00
Third, Rufus T. Tobey	1 00
Paradise of Autumn, William Milman	3 00
Second, Leverett M. Chase	2 00
Third, Warren Fenno	1 00

Any other variety, Charles E. Swain, Bosc	$3 00
Second, Mrs. S. Klaus, Seckel	2 00
Third, Warren Fenno, Souvenir du Congrès	1 00
PEACHES. — Coolidge's Favorite, Sumner Coolidge	3 00
Second, Charles S. Smith	2 00
Third, Samuel Hartwell	1 00
Crawford's Early, N. D. Harrington	3 00
Second, Francis Blake	2 00
Third, F. W. Mendum	1 00
Crosby, W. D. Hinds	3 00
Second, T. A. Greenleaf	2 00
Foster, Charles F. Curtis	3 00
Second, Bowman Kenrick	2 00
Third, C. R. Safford	1 00
Oldmixon Freestone, Sumner Coolidge	3 00
Second, Bowman Kenrick	2 00
Third, Elliott Moore	1 00
Stump the World, Leverett M. Chase	3 00
Second, Louville Curtis	2 00
Third, T. A. Greenleaf	1 00
Any other variety, T. A. Greenleaf, Mountain Rose	3 00
Second, Benjamin G. Smith, Champion	2 00
Third, Rufus T. Tobey, Mountain Rose	1 00
PEACHES, ORCHARD HOUSE CULTURE. — Any variety, Miss Alice Carey	4 00
Second, Joseph H. White	3 00
NECTARINES, OUTDOOR CULTURE. — Any variety, C. C. Donnell	4 00
Second, Francis Blake	3 00
PLUMS. — Imperial Gage, George V. Fletcher	3 00
Second, William H. Hunt	2 00
Lombard, John L. Bird	3 00
Second, Mrs. S. Klaus	2 00
Third, Leverett M. Chase	1 00
Washington, Charles F. Curtis	3 00
Any other variety, Mrs. Mary T. Goddard, Pond's Seedling	3 00
Second, George V. Fletcher, Bradshaw	2 00
Third, William C. Winter, Yellow Egg	1 00
Japanese Plums, any variety, T. A. Greenleaf, Satsuma	3 00
Second, W. D. Hinds, Burbank	2 00
NATIVE GRAPES. — Six bunches of Eumelan, Benjamin G. Smith	3 00
Second, Frederick W. Damon	2 00
Massasoit, Joseph S. Chase	3 00
Second, F. J. Kinney	2 00
Moore's Early, Frederick W. Damon	3 00
Second, C. R. Robbins	2 00
Third, F. J. Kinney	1 00

Any other variety, George W. Campbell, Delaware, Ohio, Campbell's Early $3 00
Second, Benjamin G. Smith, Wilder 2 00
Third, H. R. Kinney, Green Mountain 1 00
Any variety from girdled vines, F. J. Kinney, Worden . . 3 00
Second, F. J. Kinney, Moore's Early 2 00
Third, H. R. Kinney, Agawam 1 00
Figs. — Any variety, the second prize to William McRoberts . . 1 00

September 18.

Gratuities: —

Horace Eaton, Peaches 1 00
William Everett, Souvenir du Congrès Pears 1 00

September 25.

Gratuity: —

Warren Heustis & Son, Seedling Peaches 1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

September 30 and October 1.

Special Prizes from the Samuel Appleton Fund.

Apples. — Baldwin, Joshua C. Stone 5 00
Hubbardston, M. W. Chadbourne 5 00
Pears. — Bosc, Sumner Coolidge 5 00
Sheldon, Frederick W. Damon 5 00

Benjamin V. French Fund.

Apples. — Gravenstein, C. L. Hartshorn 5 00
Rhode Island Greening, C. L. Hartshorn 5 00

Marshall P. Wilder Fund.

Pears. — Anjou, William Milman 4 00
Second, Mrs. S. Klaus 3 00
Third, George V. Fletcher 2 00
Fourth, Sumner Coolidge 1 00
Bartlett, A. T. Brown 4 00
Second, George V. Fletcher 3 00
Third, William Milman 2 00
Fourth, Leverett M. Chase 1 00
Native Grapes. — Twelve bunches of Concord, H. R. Kinney . 4 00
Second, George W. Jameson 3 00
Third, F. J. Kinney 2 00
Twelve bunches of Worden, F. J. Kinney 4 00
Second, Samuel Hartwell 3 00
Third, H. R. Kinney 2 00

Regular Prizes, Theodore Lyman Fund.

APPLES. — Baldwin, Sumner Coolidge	$4 00
Second, Mrs. Mary T. Goddard	3 00
Third, Joshua C. Stone	2 00
Dutch Codlin, Warren Fenno	3 00
Second, Sumner Coolidge	2 00
Holden, the second prize to H. R. Kinney	2 00
Third, Charles S. Smith	1 00
Fameuse, H. Whittaker	3 00
Second, Sumner Coolidge	2 00
Third, M. W. Chadbourne	1 00
Fletcher Russet, John Fletcher	3 00
Second, William H. Teele	2 00
Third, Charles F. Curtis	1 00
Gloria Mundi, Samuel Hartwell	3 00
Golden Russet, Henry E. Rich	2 00
Second, Mrs. Mary T. Goddard	1 00
Gravenstein, Benjamin M. Smith	4 00
Second, C. L. Hartshorn	3 00
Third, Charles S. Smith	2 00
Hubbardston, Mrs. Rose Buxton	4 00
Second, John Parker	3 00
Third, Samuel Hartwell	2 00
Hunt Russet, Samuel Hartwell	3 00
Second, William H. Teele	2 00
Third, S. P. Buxton	1 00
Mackintosh, F. J. Kinney	4 00
Second, George C. Rice	3 00
Third, C. M. Handley	2 00
Maiden's Blush, Warren Fenno	2 00
Northern Spy, William S. Janvrin	3 00
Second, Henry E. Rich	2 00
Third, George V. Fletcher	1 00
Porter, the second prize to George V. Fletcher	2 00
Third, Frederick W. Damon	1 00
Pound Sweet, George V. Fletcher	3 00
Second, Samuel Hartwell	2 00
Rhode Island Greening, C. L. Hartshorn	4 00
Second, A. H. Newton	3 00
Third, Henry E. Rich	2 00
Roxbury Russet, Jacob A. Leonard	4 00
Second, Sumner Coolidge	3 00
Third, Warren Fenno	2 00
Sutton, C. L. Hartshorn	3 00
Second, Henry E. Rich	2 00
Tolman's Sweet, Jacob A. Leonard	3 00

Tompkins King, George C. Rice	$3 00
Second, E. L. Conant	2 00
Third, F. J. Kinney	1 00
Any other variety, F. J. Kinney, Washington Strawberry	3 00
Second, George C. Rice, Fallawater	2 00
Third, George C. Rice, Yellow Bellflower	1 00
CRAB APPLES. — Hyslop, twenty-four specimens, J. L. Richardson,	2 00
Second, C. L. Hartshorn	1 00
EDIBLE NUTS. — Collection, named, Parry's Pomona Nurseries, Parry, N.J.	10 00

Special Prizes offered by the Society.

PEARS. — Anjou, A. K. Gould	5 00
Seckel, Joshua C. Stone	5 00
PEACHES. — Any variety, Francis Blake	5 00
NATIVE GRAPES. — Any variety, Mount Vernon Nursery	5 00

Society's Regular Prizes.

PEARS. — Angouleme, W. S. Janvrin	4 00
Second, A. T. Brown	3 00
Third, Mrs. Emmons	2 00
Fourth, Frederick W. Damon	1 00
Bosc, E. S. Converse	4 00
Second, Orlendo W. Dimick	3 00
Third, A. T. Brown	2 00
Fourth, Mary E. Walker	1 00
Clairgeau, W. S. Janvrin	3 00
Second, Warren Fenno	2 00
Third, Sumner Coolidge	1 00
Comice, A. T. Brown	3 00
Second, Mrs. Emmons	2 00
Third, Frederick W. Damon	1 00
Dana's Hovey, A. T. Brown	4 00
Second, Frederick W. Damon	3 00
Third, E. W. Wood	2 00
Fourth, George V. Fletcher	1 00
Diel, A. T. Brown	3 00
Second, Joshua C. Stone	2 00
Third, Mrs. Emmons	1 00
Fulton, E. S. Converse	3 00
Second, S. F. & F. L. Weston	2 00
Third, John Ward	1 00
Hardy, Charles F. Curtis	3 00
Second, William Milman	2 00
Third, Rufus T. Tobey	1 00
Howell, Warren Fenno	3 00
Second, A. K. Gould	2 00
Third, S. F. & F. L. Weston	1 00

Josephine of Malines, Warren Fenno	$3 00
Lawrence, W. S. Janvrin	3 00
Second, A. T. Brown	2 00
Third, Charles E. Swain	1 00
Louise Bonne of Jersey, Francis Blake	3 00
Second, A. T. Brown	2 00
Third, Charles E. Richardson	1 00
Marie Louise, Charles E. Swain	3 00
Second, Warren Fenno	2 00
Third, Mrs. Jones	1 00
Merriam, A. T. Brown	3 00
Second, Frederick W. Damon	2 00
Third, Warren Heustis & Son	1 00
Seckel, David Perkins	4 00
Second, N. D. Harrington	3 00
Third, Mrs. J. W. Porter	2 00
Fourth, Mrs. S. Klaus	1 00
Sheldon, N. D. Harrington	4 00
Second, A. T. Brown	3 00
Third, Frederick W. Damon	2 00
Fourth, Sumner Coolidge	1 00
St. Michael Archangel, T. M. Davis	3 00
Second, Warren Fenno	2 00
Third, Warren Heustis & Son	1 00
Superfin, Warren Fenno	3 00
Second, Sumner Coolidge	2 00
Third, Clifford R. Weld	1 00
Urbaniste, Mrs. Emmons	3 00
Second, A. T. Brown	2 00
Third, E. S. Converse	1 00
Vicar, A. T. Brown	3 00
Second, Mrs. Jones	2 00
Third, E. S. Converse	1 00
Winter Nelis, Mrs. Emmons	3 00
Second, A. T. Brown	2 00
Third, Clifford R. Weld	1 00
Any other variety, Warren Fenno, Pratt	3 00
Second, Rufus T. Tobey, Mount Vernon	2 00
Third, Henry Y. Gilson, Flemish Beauty	1 00
QUINCES. — Champion, Orlendo W. Dimick	3 00
Second, George V. Fletcher	2 00
Third, Charles S. Smith	1 00
Orange, Arthur F. Coolidge	3 00
Second, J. L. Richardson	2 00
Third, Joshua C. Stone	1 00
Pear, Benjamin G. Smith	3 00
Second, George L. Brown	2 00
Third, George V. Fletcher	1 00

Rea, Warren Fenno	$3 00
PEACHES. — Crawford's Late, E. M. Bruce	3 00
Second, Francis Blake	2 00
Third, H. R. Kinney	1 00
Any other variety, Benjamin M. Smith, Elberta	3 00
Second, N. D. Harrington, Seedling	2 00
Third, Charles E. Swain, Oldmixon	1 00
PEACHES, ORCHARD HOUSE CULTURE. — Any variety, Robert McLeod, Newport, R.I.	4 00
Second, Robert McLeod	3 00
PLUMS. — Coe's Golden Drop, A. K. Gould	2 00
Second, William C. Winter	1 00
Yellow Egg, George V. Fletcher	2 00
Any other variety, P. G. Hanson, Jefferson	2 00
Second, Sumner Coolidge	1 00
NATIVE GRAPES. — Six bunches of Brighton, Thomas H. Talbot	3 00
Second, Mount Vernon Nursery	2 00
Third, Samuel Hartwell	1 00
Delaware, Mount Vernon Nursery	3 00
Second, Frederick W. Damon	2 00
Third, Warren Fenno	1 00
Herbert, Benjamin G. Smith	3 00
Second, Mount Vernon Nursery	2 00
Iona, Mount Vernon Nursery	3 00
Second, Frederick W. Damon	2 00
Third, Benjamin G. Smith	1 00
Lindley, Benjamin G. Smith	3 00
Third, Frederick W. Damon	1 00
Niagara, E. S. Converse	3 00
Second, George A. Wills	2 00
Third, Benjamin G. Smith	1 00
Pocklington, Frederick W. Damon	3 00
Second, P. G. Hanson	2 00
Third, S. F. & F. L. Weston	1 00
Prentiss, Mount Vernon Nursery	3 00
Second, Benjamin G. Smith	2 00
Wilder, Benjamin G. Smith	3 00
Second, Frederick W. Damon	2 00
Third, F. J. Kinney	1 00
Any other variety, Mount Vernon Nursery, Vergennes	3 00
Second, Frederick W. Damon, Moore's Early	2 00
Third, Frederick W. Damon, Diamond	1 00
Concord, from girdled vines, H. R. Kinney	3 00
Second, F. J. Kinney	2 00
FOREIGN GRAPES. — Two bunches of any variety, E. S. Converse, Chasselas	5 00
Second, E. S. Converse, Black Alicante	4 00

CRANBERRIES. — Half peck, L. J. Fosdick, Gloriana	$3 00
Second, L. J. Fosdick, McFarlin	2 00
Third, L. J. Fosdick, Early Black	1 00
Gratuities : —	
James Comley, Collection	3 00
Mrs. E. M. Gill, "	1 00
Robert Manning, Figs	1 00
Ellwanger & Barry, Collection of Pears and Quinces, Appleton Silver Medal.	

OCTOBER 16.

Gratuities : —	
Elbridge Torrey, Sheldon Pears	1 00
William C. Clapp, " "	1 00
John L. Gardner, Seckel Pears	1 00
S. S. Crosby, Quinces	1 00
Frederick W. Damon, Iona Grapes	1 00

OCTOBER 23.

Gratuity : —	
William C. Clapp, Seckel Pears	1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 20.

Benjamin V. French Fund.

APPLES. — Baldwin, Mrs. A. W. Blake	5 00

Society's Prizes.

APPLES. — Baldwin, Mrs. A. W. Blake	3 00
Second, J. W. Clark	2 00
Third, Mrs. Mary T. Goddard	1 00
Danvers Sweet, Benjamin P. Ware	3 00
Fletcher Russet, John Fletcher	3 00
Second, William H. Teele	2 00
Hubbardston, M. W. Chadbourne	3 00
Second, John Parker	2 00
Hunt Russet, Samuel Hartwell	3 00
Second, William H. Teele	2 00
Third, F. J. Boyden	1 00
Northern Spy, William O'Connell	3 00
Second, W. S. Janvrin	2 00
Third, George V. Fletcher	1 00
Rhode Island Greening, George V. Fletcher	3 00
Second, H. A. Wheeler	2 00
Third, F. J. Boyden	1 00

Roxbury Russet, George V. Fletcher	$3 00
Second, Warren Fenno	2 00
Third, F. J. Boyden	1 00
Tolman's Sweet, A. E. Underwood	3 00
Tompkins King, John W. Clark	3 00
Second, George C. Rice	2 00
Third, Walter E. Overend	1 00
Any other variety, A. E. Underwood, Yellow Bellflower	3 00
Second, O. R. Miller, Ben Davis	2 00
Third, F. J. Boyden, Palmer	1 00
PEARS. — Angouleme, A. T. Brown	4 00
Second, Frederick W. Damon	3 00
Third, Warren Fenno	2 00
Fourth, Mrs. Emmons	1 00
Anjou, George V. Fletcher	4 00
Second, William O'Connell	3 00
Third, Mrs. S. Klaus	2 00
Fourth, William Milman	1 00
Clairgeau, Warren Fenno	3 00
Second, W. S. Janvrin	2 00
Third, William T. Hall	1 00
Comice, A. T. Brown	4 00
Second, Mrs. Emmons	3 00
Third, Frederick W. Damon	2 00
Fourth, Walter E. Overend	1 00
Dana's Hovey, A. T. Brown	4 00
Second, Frederick W. Damon	3 00
Third, George V. Fletcher	2 00
Fourth, Warren Fenno	1 00
Diel, Mrs. Emmons	3 00
Second, Mrs. Whitney	2 00
Third, A. T. Brown	1 00
Glout Morceau, E. A. Hall	3 00
Second, W. H. Chipman	2 00
Third, Clifford R. Weld	1 00
Josephine of Malines, Warren Fenno	3 00
Second, Walter E. Overend	2 00
Third, John L. Bird	1 00
Langelier, Mrs. S. Klaus	3 00
Second, Clifford R. Weld	2 00
Third, T. M. Davis	1 00
Lawrence, W. S. Janvrin	3 00
Second, A. T. Brown	2 00
Third, Rufus T. Tobey	1 00
Vicar, Mrs. Jones	3 00
Second, A. T. Brown	2 00
Third, F. H. Gilson	1 00

Winter Nelis, Mrs. Emmons	$3 00
Second, A. T. Brown	2 00
Third, T. M. Davis	1 00
Any other variety, William Milman, Mount Vernon	3 00
Second, A. T. Brown, Bosc	2 00
Third, Frederick W. Damon, Sheldon	1 00
FOREIGN GRAPES. — Two bunches of any variety, George McWilliam, Alicante	5 00
Second, George McWilliam, Lady Downes	4 00
Third, George McWilliam, Mrs. Pearson	3 00

Gratuity : —

George W. Campbell, Delaware, Ohio, Seedling Grape, Campbell's Early, First Class Certificate of Merit.

REPORT

OF THE

COMMITTEE ON VEGETABLES

FOR THE YEAR 1897.

By CHARLES N. BRACKETT, CHAIRMAN.

The past season has been an unusually trying one to the growers of vegetables. Owing to the too frequent rains, followed by cold cloudy weather during the growing season, many crops suffered severely, while some of the leading ones proved almost entire failures. It follows as a natural consequence that some of our exhibitions were to a greater or less extent affected from this cause. Yet, notwithstanding all the drawbacks and discouragements with which our contributors had to contend, the exhibits have on the whole been more satisfactory than we were led to expect.

Good cultivation, it is true, enters largely into our success as tillers of the soil, but it does not follow that he who tills best shall always have the largest yield. It matters not how fertile the soil when climatic influences are adverse. So much depends on atmospheric conditions during certain periods of plant growth that, although all other requisites are complete, total failures are sometimes the inevitable result, some sections being blest with abundant crops, while those of others are poor and imperfect. The cultivator, of all men, must continually feel himself at the mercy of the elements; he can never count with safety upon a crop until it is harvested.

During the winter months forced vegetables have been shown in about the usual quantity and variety, most of the prizes having been competed for and awarded.

On nearly every Saturday from the 2d of January to the 27th of November creditable exhibits of vegetables (forced or other) have been made in greater or less quantity, many of them of great excellence.

The weekly summer shows, while not presenting any extraordinary features, have generally been good, each week bringing many exhibitors and quite a throng of interested visitors, who seemed always ready to express their appreciation of the variety of objects placed upon the tables for their inspection.

As a complete list of contributors and the awards made to each constitutes a part of this report, we shall not attempt to describe, in detail, the exhibits made, but will only mention such as appear to be deserving of special notice, either as new or out of the ordinary line of exhibits.

The first of this kind which claimed our attention were some extraordinarily fine and well-grown specimens of Mushrooms (*Agaricus campestris*) shown by A. W. Crockford, February 6, and later, on several occasions, by James Comley, whose specimens have rarely, if ever, been excelled. May 15 P. G. Hanson showed remarkably large and well-grown Asparagus — four bunches, containing twelve stalks each, which weighed 10 lbs.

A new Pea was exhibited June 26 and July 3 by George D. Moore, under the name of Henderson's 1897, receiving the first prize on both occasions. The pods were large and well filled with peas of excellent quality, as we can testify from trial. We consider it a decided acquisition and worthy of trial.

We must not fail to mention the splendid specimens of Greenflesh Melons shown by Edward Russell, August 7. We think they were the finest ever seen in the Hall. A single specimen tipped the scales at 25½ lbs. They were certainly highly creditable to the skill of the grower, and formed the centre of attraction at this show.

By way of comparison with other seasons, it may be of interest to note the date of some of the first exhibits of a few of our most important vegetables.

The first Asparagus of the season was shown May 1, William H. Hunt receiving the first prize. Peas were exhibited for the first time June 19, Isaac E. Coburn showing two varieties. The first early Potatoes came from the Joseph S. Fay estate, July 3, and

were good enough to take all three of the prizes. The varieties were the Hebron, Rose, and Savoy. June 19, from the same place, came excellent specimens of Cauliflowers and three varieties of remarkably well-grown Lettuce, all of which were ample evidence of the skill of the gardener, M. H. Walsh. Tomatoes of outdoor growth were seen on our tables for the first time July 10, Sumner Coolidge and A. W. Blake being the exhibitors. The variety shown was Atlantic. This crop was among those which were badly injured by too much rain, and, although some fine specimens were on exhibition from time to time during the season, they were not shown in such large quantities and perfection as in previous seasons.

As usual, the closing weekly exhibition, September 11, was one of the most noteworthy of the season, and called forth a close competition from a large number of growers. There was a great variety, and most of the objects shown were at their best.

The Annual Exhibition, September 30 and October 1, was good, creditably sustaining this department of the Society's exhibitions. The large array of vegetables, comprising every seasonable variety, completely filled the Lower Hall and attracted much attention from the visiting public.

In speaking of the objects presented to the Committee for their examination on this occasion, we have only to say that the great and important feature of the exhibition was the total absence of ill-cultivated specimens. There were various degrees of excellence, it is true, but everything was excellent in its way. We may even add that some of the poorest specimens exhibited at this show would have carried away the first prizes less than twenty-five years ago.

The Potato and Tomato exhibits were much less in quantity than usual, both these crops having been more or less injured by unfavorable weather. The first prize for the best four varieties of Potatoes was awarded to F. J. Kinney, and B. S. Nickerson received the first for the best three varieties of Tomatoes.

There was also a very fine show of Celery on this occasion, the principal exhibitors being Messrs. Heustis, Bruce, Coolidge, and Hartshorn.

William N. Craig's collection of six varieties of remarkably well-grown Onions was deserving of special mention, he taking the first and second prizes in three different classes.

The interest manifested in our Native Mushrooms, noticed in our report last year, still continues without abatement, attracting a throng of interested persons at each and every exhibit that has been made throughout the season. All the prizes offered in the Schedule have been awarded.

Before closing this report we would call the attention of contributors to important changes and alterations in the Schedule for the coming year. The four prizes for the best collections of vegetables covering fifty square feet, arranged for effect, at the Annual Exhibition, which have been in the Schedule for the past two years, have been dropped, it being the unanimous opinion of the Committee that the amount devoted to this purpose could be more advantageously employed in furthering the interests of the Society in a different direction.

The amount appropriated for Vegetables for 1897 was	$1,200 00
The Committee have awarded in prizes and gratuities,	1,157 00
Leaving an unexpended balance of . . .	$43 00

All of which is respectfully submitted.

For the Committee,

C. N. BRACKETT, *Chairman.*

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1897.

JANUARY 2.

Gratuities: —

Warren Heustis & Son, Celery	$1 00
James Comley, "	1 00
Norris R. Comley, Rhubarb	1 00

JANUARY 9.

RADISHES. — Four bunches of any variety, Arthur F. Coolidge	3 00
CUCUMBERS. — Pair of any variety, Francis Blake	3 00
Second, Nathaniel T. Kidder	2 00
Third, E. B. Smith	1 00
CAULIFLOWERS. — Four specimens, William H. Teele	3 00
LETTUCE. — Four heads of Tennisball, Arthur F. Coolidge	3 00
Second, E. B. Smith	2 00
Third, B. S. Nickerson	1 00
PARSLEY. — Two quarts, W. N. Craig	2 00
Second, Arthur F. Coolidge	1 00
TOMATOES. — Twelve specimens, William C. Winter, Stone	3 00
Second, William C. Winter, Livingston's	2 00
Third, Francis Blake, Essex	1 00

Gratuities: —

Hon. Aaron Low, Spinach	1 00
Warren Heustis & Son, Celery	1 00
Mrs. E. M. Gill, Mushrooms	1 00

JANUARY 16.

Gratuities: —

Warren Heustis & Son, Celery	1 00
Norris R. Comley, Rhubarb	1 00

JANUARY 23.

Gratuities: —

Hon. Aaron Low, Spinach	1 00
Mrs. E. M. Gill, Mushrooms	1 00
George D. Moore, Lettuce	1 00

FEBRUARY 6.

RADISHES. — Four bunches of any variety, Arthur F. Coolidge	2 00
Second, Joshua C. Stone	1 00
CUCUMBERS. — Pair of any variety, Francis Blake	3 00
Second, H. J. Lund	2 00

DANDELIONS. — Peck, Warren Heustis & Son	$3 00
LETTUCE. — Four heads of Tennisball, George D. Moore	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00
MUSHROOMS. — Twenty-four specimens, A. W. Crockford	3 00
RHUBARB. — Twelve stalks, C. F. Smith	3 00
Second, George Sanderson	2 00
TOMATOES. — Twelve specimens, Charles H. Hovey, South Pasadena, Cal.	3 00
Second, Francis Blake	2 00
Third, William C. Winter	1 00

Gratuities : —

Warren Heustis & Son, Celery	1 00
Arthur F. Coolidge, "	1 00
Hon. Aaron Low, Spinach	1 00
A. W. Crockford, Mushrooms	1 00
Mrs. E. M. Gill, "	1 00

FEBRUARY 13.

Gratuity : —

Warren Heustis & Son, Dandelions	1 00

FEBRUARY 20.

Gratuities : —

George D. Moore, Radishes	1 00
Warren Heustis & Son, Dandelions	1 00

FEBRUARY 27.

Gratuities : —

George D. Moore, Radishes	1 00
Hon. Aaron Low, Spinach	1 00
Arthur F. Coolidge, Collection	2 00

MARCH 6.

Gratuities : —

Mrs. E. M. Gill, Mushrooms	1 00
Warren Heustis & Son, Dandelions	1 00

MARCH 13.

Gratuities : —

E. B. Smith, Cucumbers	1 00
Hon. Aaron Low, Spinach	1 00
A. W. Crockford, Radishes	1 00
Arthur F. Coolidge, Collection	2 00

MARCH 20.

Gratuities : —

E. B. Smith, Cucumbers	1 00
George D. Moore, Collection	2 00
Arthur F. Coolidge, "	1 00

SPRING EXHIBITION.

MARCH 23, 24, 25, AND 26.

Prizes from the William J. Walker Fund.

RADISHES. — Four bunches of Turnip Rooted, H. R. Kinney	$2 00
Second, George D. Moore	1 00
Four bunches of Long Scarlet, H. R. Kinney	2 00
CUCUMBERS. — Pair of White Spine, George D. Moore	3 00
Second, E. B. Smith	2 00
CELERY. — Four roots, the third prize to H. R. Kinney	1 00
DANDELIONS. — Peck, Warren Heustis & Son	3 00
Second, Hon. Aaron Low	2 00
Third, Arthur F. Coolidge	1 00
LETTUCE. — Four heads of Tennisball, George D. Moore	3 00
Second, D. L. Tappan	2 00
Third, Arthur F. Coolidge	1 00
WATER CRESS. — Two quarts, Benjamin P. Ware	2 00
PARSLEY. — Two quarts, W. N. Craig	2 00
Second, H. R. Kinney	1 00
MUSHROOMS. — Twenty-four specimens, A. W. Crockford	3 00
Second, H. R. Kinney	2 00
Third, E. S. Converse	1 00
RHUBARB. — Twelve stalks, George Sanderson	3 00
Second, Joshua C. Stone	2 00
Third, James Comley	1 00
TOMATOES. — Twelve specimens, Francis Blake	3 00
Second, W. N. Craig, May's Favorite	2 00
Third, W. N. Craig, Eclipse	1 00
Gratuities: —	
Benjamin P. Ware, Brussels Sprouts	1 00
Warren Heustis & Son, Parsley	1 00
Hon. Aaron Low, Collection	3 00
George D. Moore, "	2 00

MARCH 27.

Gratuity: —	
George D. Moore, Lettuce and Cucumbers	1 00

APRIL 3.

CUCUMBERS. — Pair of White Spine, Varnum Frost	3 00
Second, George D. Moore	2 00
Third, E. B. Smith	1 00
Gratuities: —	
W. N. Craig, Tomatoes	1 00
Hon. Aaron Low, Dandelions	1 00
George D. Moore, Collection	2 00

APRIL 10.

Gratuity : —

James Comley, Collection	$2 00

APRIL 17.

Gratuities : —

James Comley, Mushrooms and Lettuce	2 00
Mrs. E. M. Gill, Mushrooms	1 00
Warren Heustis & Son, Dandelions	1 00

APRIL 24.

Gratuities : —

James Comley, Mushrooms	1 00
Warren Heustis & Son, Dandelions	1 00
Hon. Aaron Low, Collection	1 00

MAY EXHIBITION.

MAY 1.

Prizes from the William J. Walker Fund.

ASPARAGUS. — Four bunches, twelve stalks each, William H. Hunt,	3 00
Second, Varnum Frost	2 00
Third, P. G. Hanson	1 00
CUCUMBERS. — Pair of White Spine, Varnum Frost	3 00
Second, George D. Moore	2 00
Third, Arthur F. Coolidge	1 00
SPINACH. — Peck, Joshua C. Stone	3 00
Second, Arthur F. Coolidge	2 00
Third, Hon. Aaron Low	1 00
DANDELIONS. — Peck, George D. Moore	2 00
Second, Varnum Frost	1 00
LETTUCE. — Four heads, Arthur F. Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, Mrs. Mary T. Goddard	1 00
RHUBARB. — Twelve stalks, Hon. Aaron Low	2 00
Second, Warren Heustis & Son	1 00

Gratuities : —

Mrs. Mary T. Goddard, Cauliflowers	1 00
H. R. Kinney, Radishes	1 00
William Nicholson, Tomatoes	1 00
W. C. Winter, "	1 00
James Comley, Mushrooms	2 00
Warren Heustis & Son, Dandelions	1 00
W. N. Craig, Collection	3 00
Arthur F. Coolidge, "	2 00
Hon. Aaron Low, "	1 00

MAY 8.

Gratuities : —

P. G. Hanson, Asparagus	$1 00
Warren Heustis & Son, Rhubarb	1 00
Varnum Frost, Cucumbers	1 00
Arthur F. Coolidge, Collection	3 00

MAY 15.

Gratuities : —

P. G. Hanson, Asparagus (weight of four bunches, ten pounds)	1 00
William H. Hunt, Asparagus	1 00
James Comley, Mushrooms	1 00
Arthur F. Coolidge, Collection	2 00
Warren Heustis & Son, "	1 00
Hon. Aaron Low, "	1 00

MAY 22.

Gratuities : —

P. G. Hanson, Asparagus	1 00
W. H. Hunt, "	1 00
James Comley, Mushrooms	1 00
George D. Moore, Collection	2 00
Hon. Aaron Low, "	1 00
Warren Heustis & Son, "	1 00

MAY 29.

Gratuity : —

Warren Heustis & Son, Collection	1 00

RHODODENDRON SHOW.

JUNE 3 AND 4.

Prizes from the Theodore Lyman Fund.

BEETS. — Twelve specimens, any variety, H. R. Kinney	3 00
Second, Arthur F. Coolidge	2 00
Third, Warren Heustis & Son	1 00
CARROTS. — Twelve Short Scarlet, W. N. Craig	3 00
Second, Warren Heustis & Son	2 00
RADISHES. — Four bunches of Turnip Rooted, Warren Heustis & Son,	2 00
Second, George D. Moore	1 00
Four bunches of Long Scarlet, George D. Moore	2 00
Second, H. R. Kinney	1 00
ASPARAGUS. — Four bunches, twelve stalks each, P. G. Hanson	3 00
Second, William H. Hunt	2 00
CUCUMBERS. — Pair, George D. Moore	3 00
Second, H. R. Kinney	2 00
Third, Arthur F. Coolidge	1 00

LETTUCE. — Four heads, George D. Moore	$3 00
Second, Arthur F. Coolidge	2 00
Third, Warren Heustis & Son	1 00
RHUBARB. — Twelve stalks, George D. Moore	3 00
Second, Warren Heustis & Son	2 00
Third, W. N. Craig	1 00
MUSHROOMS. — Twenty-four specimens, H. R. Kinney	3 00
Second, Mrs. E. M. Gill	2 00
TOMATOES. — Twelve specimens, William C. Winter, Livingston	3 00
Second, William C. Winter, Stone	2 00
Third, M. S. Stevens, May's Favorite	1 00
Gratuities: —	
Warren Heustis & Son, Collection	2 00
George D. Moore, "	2 00
Arthur F. Coolidge, "	1 00
John Jeffries, "	1 00
Hon. Aaron Low, "	1 00

JUNE 12.

Gratuities: —	
Hon. Joseph S. Fay, Cauliflowers and four varieties of Lettuce	3 00
Mrs. E. M. Gill, Mushrooms	1 00
George D. Moore, Collection	2 00
Hon. Aaron Low, "	1 00
W. N. Craig, "	1 00
Warren Heustis & Son, Collection	1 00

JUNE 19.

Gratuities: —	
Estate of Joseph S. Fay, Cauliflowers and Lettuce	2 00
I. E. Coburn, two varieties of Peas	1 00

ROSE AND STRAWBERRY SHOW.

JUNE 22 AND 23.

BEETS. — Twelve Summer Turnip Rooted, H. R. Kinney	3 00
Second, Warren Heustis & Son	2 00
Third, Arthur F. Coolidge	1 00
ONIONS. — Twelve specimens, W. N. Craig	3 00
Second, George D. Moore	2 00
Third, E. C. Lewis	1 00
CUCUMBERS. — Pair of White Spine, George D. Moore	3 00
Second, Arthur F. Coolidge	2 00
Third, H. R. Kinney	1 00
Any other variety, George D. Moore, Eureka	3 00
CABBAGES. — Three of any variety, trimmed, George D. Moore, Early Spring	3 00
Second, George D. Moore, Wakefield	2 00

Lettuce. — Four heads of any variety, George D. Moore	$2 00
Second, Warren Heustis & Son	1 00
Peas. — Half-peck of any variety, E. C. Lewis, Nott's Excelsior	3 00
Second, Estate of Joseph S. Fay, American Wonder	2 00
Third, Elliott Moore, " "	1 00
Gratuities: —	
Estate of Joseph S. Fay, Cauliflowers	1 00
W. N. Craig, "	1 00
Warren Heustis & Son, Tomatoes	1 00
William C. Winter, "	1 00
George D. Moore, Collection	2 00

June 26.

Onions. — Twelve specimens, George D. Moore	2 00
Second, Sumner Coolidge	1 00
Squashes. — Four Long Warted, Sumner Coolidge	2 00
Four Scalloped, Sumner Coolidge	2 00
Cabbages. — Three of any variety, trimmed, George D. Moore, Early Spring	3 00
Second, George D. Moore, Wakefield	2 00
Third, Warren Heustis & Son	1 00
Peas. — Half-peck of American Wonder, Estate of Joseph S. Fay	3 00
Second, Hon. Aaron Low	2 00
Third, H. R. Kinney	1 00
Half-peck of any other variety, George D. Moore, Henderson's 1897	3 00
Second, John L. Gardner, Nott's Excelsior	2 00
Third, E. C. Lewis, " "	1 00
Gratuities: —	
Warren Heustis & Son, Collection	1 00
John Jeffries, "	1 00
E. C. Lewis, "	1 00
George D. Moore, "	1 00
Hon. Aaron Low, "	1 00

July 3.

Potatoes. — Twelve specimens, Estate of Joseph S. Fay, Hebron	3 00
Second, Estate of Joseph S. Fay, Savoy	2 00
Third, Estate of Joseph S. Fay, Rose	1 00
Peas. — Half-peck of any variety, George D. Moore, Henderson's 1897	3 00
Second, Hon. Aaron Low, American Wonder	2 00
Third, Estate of Joseph S. Fay, Advancer.	1 00

Gratuities: —

William C. Winter, Tomatoes	$1 00
Warren Heustis & Son, Collection	1 00
Hon. Aaron Low, "	1 00
George D. Moore, "	1 00
Arthur F. Coolidge, "	1 00

JULY 10.

Prizes from the Levi Whitcomb Fund.

CABBAGES. — Three Drumhead, trimmed, George D. Moore, Brunswick	3 00
Second, George D. Moore, Stone Mason	2 00
BEANS. — Half-peck of Cranberry, Joshua C. Stone	3 00
Second, Isaac E. Coburn	2 00
TOMATOES. — Open culture, twelve specimens, Sumner Coolidge, Atlantic	3 00
Second, A. W. Blake	2 00

Gratuities: —

Hon. Aaron Low, Collection of Peas	1 00
I. E. Coburn, " " "	1 00
Arthur F. Coolidge, Collection of Beans	1 00
Warren Heustis & Son, Collection	1 00
E. C. Lewis, "	1 00
George D. Moore, "	1 00
W. N. Craig, "	1 00

JULY 17.

POTATOES. — Twelve specimens, Estate of Joseph S. Fay, Hebron	3 00
Second, Hon. Aaron Low, Fortune	2 00
Third, Estate of Joseph S. Fay, Rose	1 00
LETTUCE. — Four heads of any variety, John Jeffries	2 00
Second, Estate of Joseph S. Fay	1 00
SWEET CORN. — Twelve ears, Sumner Coolidge, Hybrid	3 00
Second, Sumner Coolidge, Cory	2 00
Third, Joshua C. Stone, "	1 00
TOMATOES. — Open culture, twelve specimens, Sumner Coolidge, Atlantic	3 00
Second, Arthur F. Coolidge, May's Favorite	2 00
Third, A. W. Blake, Atlantic	1 00

Gratuities: —

Nathaniel T. Kidder, Tomatoes	1 00
Warren Heustis & Son, Collection	1 00
George D. Moore, "	1 00
Hon. Aaron Low, "	1 00
Estate of Joseph S. Fay, "	1 00

JULY 24.

POTATOES. — Any variety, twelve specimens, Estate of Joseph S. Fay, Hebron	$3 00
Second, Estate of Joseph S. Fay, Savoy	2 00
Third, Hon. Aaron Low, Early Essex	1 00
PEAS. — Half-peck of any variety, Hon. Aaron Low, New Life	3 00
Second, Hon. Aaron Low, Heroine	2 00
SWEET CORN. — Twelve ears of Crosby, Sumner Coolidge	3 00
Second, John C. Stone	2 00
Twelve ears of any other variety, Sumner Coolidge, Hybrid	3 00
Second, Samuel Hartwell, Cory	2 00
Third, Sumner Coolidge, Cory	1 00
TOMATOES. — Twelve specimens, Sumner Coolidge, Atlantic	3 00
Second, Isaac E. Coburn, Comrade	2 00
Third, Sumner Coolidge, Seedling	1 00
NATIVE MUSHROOMS. — Named collection of not less than five edible varieties, Miss Ellen W. Rumrill	4 00
Second, Mrs. Kate E. Parker	3 00
Third, Miss Constance Alexander and Miss Annie Scorgie	2 00
Gratuity : —	
Miss Helen M. Noyes, Collection of Mushrooms	2 00

JULY 31.

BEANS. — Two quarts of Goddard, shelled, Warren Heustis & Son	3 00
Half-peck of Horticultural, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00
Third, Joshua C. Stone	1 00
TOMATOES. — Twelve specimens of Comrade, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00
Third, Joshua C. Stone	1 00
Twelve specimens of any other variety, Sumner Coolidge, Atlantic,	3 00
Second, Arthur F. Coolidge, Atlantic	2 00
Third, Joshua C. Stone, Boston Market	1 00
EGG PLANT. — Four specimens of Round Purple, Sumner Coolidge,	3 00
Second, Arthur F. Coolidge	2 00
Gratuities : —	
Joshua C. Stone, Melons	1 00
Warren Heustis & Son, Collection	1 00
Arthur F. Coolidge, "	1 00
Hon. Aaron Low, "	1 00

AUGUST 7.

GREENFLESH MELONS. — Four specimens, Edward Russell (weight of largest specimen, 25½ lbs.)	3 00
Second, Joshua C. Stone	2 00

Sweet Corn. — Twelve ears, Joshua C. Stone	$3 00
Second, Hon. Aaron Low, Quincy Market	2 00
Third, Hon. Aaron Low, Crosby	1 00
Egg Plant. — Four specimens of Round Purple, Sumner Coolidge,	2 00
Second, Arthur F. Coolidge	1 00

August 14.

Potatoes. — Twelve specimens of any variety, Estate of Joseph S. Fay, Hebron	3 00
Second, Estate of Joseph S. Fay, Queen	2 00
Third, Estate of Joseph S. Fay, Rose	1 00
Onions. — Twelve specimens, W. N. Craig	3 00
Second, George D. Moore	2 00
Third, Warren Heustis & Son	1 00
Greenflesh Melons. — Four specimens, Joshua C. Stone	3 00
Second, Arthur F. Coolidge	2 00
Celery. — Four roots of any variety, Arthur F. Coolidge	3 00
Second, Warren Heustis & Son	2 00
Beans. — Two quarts of Large Lima, Warren Heustis & Son	3 00
Second, Sumner Coolidge	2 00
Two quarts of Goddard, shelled, Isaac E. Coburn	3 00
Second, Warren Heustis & Son	2 00
Third, Rev. Calvin Terry	1 00
Sweet Corn. — Twelve ears of Potter's Excelsior, Joshua C. Stone,	3 00
Second, Arthur F. Coolidge	2 00
Twelve ears of any other variety, P. G. Hanson, Crosby's Improved,	3 00
Second, Samuel Hartwell, Burr's	2 00
Third, Joshua C. Stone, Quincy Market	1 00
Peppers. — Twelve specimens of Squash, Arthur F. Coolidge	3 00
Second, George W. Jameson	2 00
Third, Hon. Aaron Low	1 00
Any other variety, Hon. Aaron Low, Spanish Monstrous	3 00
Second, Hon. Aaron Low, Elephant's Trunk	1 00

August 21.

Greenflesh Melons. — Four specimens, Joshua C. Stone	3 00
Second, Arthur F. Coolidge	2 00
Salmon Flesh Melons. — Four specimens, the third prize to Joshua C. Stone	1 00
Watermelons. — Pair, Joshua C. Stone	3 00
Cabbages. — Three of any variety, trimmed, Hon. Aaron Low	3 00
Second, Warren Heustis & Son	2 00
Third, Arthur F. Coolidge	1 00
Celery. — Four roots, Arthur F. Coolidge	3 00
Second, Warren Heustis & Son	2 00

Beans. — Two quarts of Large Lima, Warren Heustis & Son	$3 00
Second, Sumner Coolidge	2 00
Two quarts of Dwarf Lima, Warren Heustis & Son	3 00
Martynias. — Twelve specimens, Hon. Aaron Low	2 00
Native Mushrooms. — Named collection of not less than five edible varieties, Miss Ellen W. Rumrill	3 00
Second, Mrs. Sarah L. Woodward	2 00

Gratuities : —

Mrs. Mary T. Goddard, Tomatoes	1 00
E. C. Lewis, Collection	4 00
Arthur F. Coolidge, Collection	2 00

September 4.

Gratuity : —

Warren Heustis & Son, Paris Golden Celery	1 00

September 11.

Turnips. — Twelve Flat, F. J. Kinney	3 00
Second, Hon. Aaron Low	2 00
Third, C. L. Hartshorn	1 00
Greenflesh Melons. — Four specimens, Samuel Hartwell	3 00
Second, E. C. Lewis	2 00
Third, E. C. Lewis	1 00
Salmon Flesh Melons. — Four specimens, Joshua C. Stone	3 00
Second, E. C. Lewis	2 00
Third, Joshua C. Stone	1 00
Watermelons. — Two specimens, Joshua C. Stone	3 00
Cauliflowers. — Four specimens, De Souza Brothers	3 00
Second, William H. Teele	2 00
Third, Elliott Moore	1 00
Lettuce. — Four heads of any variety, Arthur F. Coolidge	3 00
Second, Sumner Coolidge	2 00
Third, E. C. Lewis	1 00
Celery. — Four roots of any variety, Warren Heustis & Son	3 00
Second, Arthur F. Coolidge	2 00
Third, George D. Moore	1 00
Parsley. — Two quarts, Arthur F. Coolidge	2 00
Second, John Jeffries	1 00
Beans. — Large Lima, two quarts, Mrs. Mary T. Goddard	3 00
Second, Warren Heustis & Son	2 00
Third, E. C. Lewis	1 00
Corn. — Sweet, twelve ears of Potter's Excelsior, Rev. Calvin Terry	3 00
Second, Hon. Aaron Low	2 00
Third, Mrs. Mary T. Goddard	1 00

Any other Sweet variety, C. L. Hartshorn	$3 00
Second, O. R. Robbins	2 00
Third, Hon. Aaron Low, Champion	1 00
EGG PLANT. — Four specimens of Round Purple, Sumner Coolidge,	3 00
Second, George D. Moore	2 00
Third, E. C. Lewis	1 00
TOMATOES. — Three varieties, twelve specimens each, Arthur F. Coolidge	5 00
Second, Isaac E. Coburn	4 00
Third, Hon. Aaron Low	3 00
Twelve Aristocrat, Varnum Frost	3 00
Second, Hon. Aaron Low	2 00
Third, E. C. Lewis	1 00
Twelve Comrade, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00
Third, Joshua C. Stone	1 00
Twelve May's Favorite, Varnum Frost	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, Hon. Aaron Low	1 00
Twelve of any other variety, Varnum Frost, Stone	3 00
Second, Isaac E. Coburn, Stone	2 00
Third, Isaac E. Coburn, Ignotum	1 00
MARTYNIAS. — Twelve specimens, Hon. Aaron Low	2 00
Second, George W. Jameson	1 00
OKRA. — Twelve specimens, E. C. Lewis	2 00
PEPPERS. — Twelve specimens of Squash, Hon. Aaron Low	2 00
Second, George Lincoln	1 00
Any other variety, E. C. Lewis, Ruby King	2 00
Second, C. L. Hartshorn, Bull Nose	1 00
NATIVE MUSHROOMS. — Named collection, not less than five edible varieties, Miss Helen M. Noyes	3 00
Second, Miss Ellen W. Rumrill	2 00
Gratuities: —	
W. N. Craig, three varieties of Onions	2 00
Warren Heustis & Son, Celery	1 00
George D. Moore, Collection	2 00

SEPTEMBER 18.

Gratuities: —	
William Doran & Son, Tomatoes	1 00
Warren Heustis & Sons, Celery	1 00
Rev. Calvin Terry, Collection	1 00

SEPTEMBER 25.

Gratuity: —	
John Jeffries, Collection	1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 30 AND OCTOBER 1.

Regular Prizes.

BEETS. — Twelve Turnip Rooted, Varnum Frost	$3 00
Second, P. G. Hanson	2 00
Third, Joshua C. Stone	1 00
CARROTS. — Twelve Long Orange, H. R. Kinney	3 00
Second, Joseph Thorp	2 00
Third, E. C. Lewis	1 00
Twelve Intermediate, H. R. Kinney	3 00
Second, Mrs. Mary T. Goddard	2 00
PARSNIPS. — Twelve Long, George D. Moore	3 00
Second, H. R. Kinney	2 00
Third, E. C. Lewis	1 00
POTATOES. — Four varieties, twelve specimens each, F. J. Kinney	5 00
Second, Mrs. Mary T. Goddard	4 00
Third, C. H. Thomas	3 00
Twelve Carman No. 1, Elliott Moore	3 00
Second, Hon. Aaron Low	2 00
Third, C. H. Thomas	1 00
Twelve Clark, F. J. Kinney	3 00
Second, C. H. Thomas	2 00
Third, Mrs. Mary T. Goddard	1 00
Twelve Hebron, F. J. Kinney	3 00
Second, E. C. Lewis	2 00
Third, Henry E. Rich	1 00
Twelve Rose, H. R. Kinney	3 00
Second, Henry E. Rich	2 00
Third, C. H. Thomas	1 00
Twelve of any other variety, F. J. Kinney, New Queen	3 00
Second, Henry E. Rich, American Wonder	2 00
Third, E. M. Bruce, New Queen	1 00
SALSIFY. — Twelve specimens, J. J. Lyons	3 00
Second, George D. Moore	2 00
Third, Warren Heustis & Son	1 00
TURNIPS. — Twelve Flat, F. J. Kinney	3 00
Second, C. H. Thomas	2 00
Third, Elliott Moore	1 00
Twelve Swedish, F. J. Kinney	3 00
Second, Joseph Thorp	2 00
ONIONS. — Twelve Danvers, W. N. Craig	3 00
Second, W. N. Craig, Yellow Globe	2 00
Third, C. L. Hartshorn	1 00
Twelve Red, W. N. Craig, Red Globe	3 00
Second, W. N. Craig, Wethersfield	2 00
Third, C. L. Hartshorn	1 00

Twelve White, C. L. Hartshorn	$2 00
Second, E. C. Lewis	1 00
Any other variety, W. N. Craig, Ailsa Craig	3 00
Second, W. N. Craig, Prizetaker	2 00
Third, C. L. Hartshorn, "	1 00
SQUASHES. — Three Bay State, Warren Heustis & Son	3 00
Second, E. C. Lewis	2 00
Third, Hon. Aaron Low	1 00
Three Hubbard, P. G. Hanson	3 00
Second, Arthur F. Coolidge	2 00
Third, C. L. Hartshorn	1 00
Three Hybrid Turban, P. G. Hanson	3 00
Second, C. L. Hartshorn	2 00
Third, E. C. Lewis	1 00
Three Marblehead, P. G. Hanson	3 00
Second, E. C. Lewis	2 00
Three Marrow, Varnum Frost	3 00
Second, Warren Heustis & Son	2 00
Third, Arthur F. Coolidge	1 00
Any other variety, C. L. Hartshorn	3 00
Second, Benjamin K. Bliss, Pride of the Amazon	2 00
Third, Hon. Aaron Low, Plymouth Rock	1 00
WATERMELONS. — Two specimens, B. S. Nickerson	3 00
Second, Hon. Aaron Low	2 00
Third, Elliott Moore	1 00
BRUSSELS SPROUTS. — Half-peck, John Jeffries	3 00
Second, H. R. Kinney	2 00
Third, E. C. Lewis	1 00
CABBAGES. — Three Drumhead, trimmed, Hon. Aaron Low	3 00
Second, E. C. Lewis	2 00
Third, Mrs. Mary T. Goddard	1 00
Three Red, trimmed, Hon. Aaron Low	3 00
Second, Samuel Hartwell	2 00
Third, H. R. Kinney	1 00
Three Savoy, trimmed, Samuel Hartwell	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, H. R. Kinney	1 00
CAULIFLOWERS. — Four specimens, William H. Teele	5 00
Second, De Souza Brothers	4 00
Third, John McCarthy	3 00
CELERY. — Four roots of Paris Golden, best kept during the Exhibition, Warren Heustis & Son	5 00
Second, Arthur F. Coolidge	4 00
Third, C. L. Hartshorn	3 00
Fourth, E. M. Bruce	2 00
Any other variety, E. M. Bruce, Perle le Grande	5 00
Second, E. M. Bruce, New Queen	4 00

Third, Arthur Nixon	$3 00
Fourth, H. R. Kinney	2 00
ENDIVE. — Four specimens, H. R. Kinney	3 00
Second, Mrs. Haller	2 00
Third, E. C. Lewis	1 00
LETTUCE. — Four heads, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, Arthur F. Coolidge	1 00
PARSLEY. — Two quarts, John Jeffries	2 00
Second, Arthur F. Coolidge	1 00
HORSERADISH. — Six roots, H. R. Kinney	2 00
Second, George D. Moore	1 00
CORN. — Yellow or Field, twenty-five ears, traced, Elliott Moore,	3 00
Second, Henry E. Rich	2 00
Third, Henry E. Rich	1 00
Sweet, twelve ears, Isaac E. Coburn, Potter's Excelsior	3 00
Second, Mrs. E. M. Gill, Bourne's Favorite	2 00
Third, Hon. Aaron Low	1 00
EGG PLANT. — Four specimens of Round Purple, Sumner Coolidge,	3 00
Second, H. R. Kinney	2 00
Third, George D. Moore	1 00
TOMATOES. — Three varieties, twelve specimens, B. S. Nickerson	5 00
Second, Arthur F. Coolidge	4 00
Third, Hon. Aaron Low	3 00
Twelve Aristocrat, Joseph Thorp	3 00
Second, Hon. Aaron Low	2 00
Third, Isaac E. Coburn	1 00
Twelve Comrade, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00
Third, Joshua C. Stone	1 00
Twelve May's Favorite, Hon. Aaron Low	3 00
Twelve of any other variety, I. E. Coburn, Stone	3 00
Second, W. Warburton, Stone	2 00
Third, Joseph Thorp, Stone	1 00
PEPPERS. — Twelve specimens of Squash, Hon. Aaron Low	3 00
Second, P. G. Hanson	2 00
Third, C. L. Hartshorn	1 00
Twelve of any other variety, Hon. Aaron Low, Ruby King	3 00
Second, Hon. Aaron Low, Bull Nose	2 00
Third, C. L. Hartshorn, Bull Nose	1 00
CULINARY HERBS. — Collection, named, W. N. Craig	5 00
COLLECTION OF VEGETABLES. — Covering fifty square feet, arranged for effect, H. R. Kinney	15 00
Second, E. C. Lewis	12 00
Third, Warren Heustis & Son	10 00
Fourth, C. L. Hartshorn	8 00

Gratuities: —

Elliott Moore, White Egg Turnips	$1 00
" " Golden Hubbard Squashes	1 00
M. B. Faxon, Collection of Squashes	1 00
E. C. Lewis, Peas	1 00
Hon. James J. H. Gregory, Peas	1 00
Mrs. E. M. Gill, Lima Beans	1 00
Mrs. Mary T. Goddard, Collection of Beans	2 00
W. N. Craig, Collection	5 00
George D. Moore, "	1 00
John Jeffries, "	1 00

OCTOBER 9.

Gratuity: —

Warren Heustis & Son, Cucumbers and Celery	1 00

OCTOBER 16.

Gratuities: —

Mrs. E. M. Gill, Lima Beans	1 00
Warren Heustis & Son, Celery and Cucumbers	1 00

OCTOBER 23.

Gratuities: —

George D. Moore, Parsnips and Lettuce	1 00
Hon. Aaron Low, Salsify and Turnips	1 00

OCTOBER 30.

Gratuities: —

George D. Moore, Celery and Salsify	1 00
Warren Heustis & Son, Celery and Cucumbers	1 00

NOVEMBER 6.

Gratuities: —

John Jeffries, Parsley	1 00
Warren Heustis & Son, Celery	1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 20.

CUCUMBERS. — Pair, Francis Blake	3 00
Second, Warren Heustis & Son	2 00
Third, C. A. Learned	1 00
CABBAGES. — Three, Red, trimmed, Hon. Aaron Low	3 00
Second, Warren Heustis & Son	2 00
Third, Mrs. Mary T. Goddard	1 00
Three Savoy, Mrs. Mary T. Goddard	3 00
CAULIFLOWERS. — Four specimens, William H. Teele	3 00
Second, B. A. De Souza	2 00

BRUSSELS SPROUTS. — Half-peck, John Jeffries, Giant	$3 00
Second, John Jeffries, Dwarf French	2 00
Third, Hon. Aaron Low	1 00
CELERY. — Four roots, E. C. Lewis	3 00
Second, Warren Heustis & Son	2 00
Third, Arthur F. Coolidge	2 00
LETTUCE. — Four heads, George D. Moore	3 00
Second, Arthur F. Coolidge	2 00
Third, C. A. Learned	1 00
TOMATOES. — Twelve specimens, grown under glass, W. C. Winter, Stone	3 00
Second, W. C. Winter, May's Favorite	2 00
Third, W. C. Winter, Chemin	1 00
Gratuities: —	
William Warburton, Parsnips	1 00
E. C. Lewis, Collection	3 00
Warren Heustis & Son, Collection	1 00
John Jeffries, "	1 00

REPORT

OF THE

Committee on School Gardens and Children's Herbariums

FOR THE YEAR 1897.

By HENRY LINCOLN CLAPP, CHAIRMAN.

GEORGE PUTNAM SCHOOL GARDEN, ROXBURY.

The following named plants were set out in the garden during the season of 1897:

Arenaria lateriflora,
Cypripedium arietinum,
" *pubescens*,
" *spectabile*,
Geum rivale,
Viola lanceolata,
" *rostrata*.

The garden has been used as in previous years, but more extensively. Whole classes have visited it repeatedly to observe the plants, and plant material has been taken from it to be studied in the class room. Ferns and composite flowers have received the most attention. Already the pupils of the ninth grade have become quite familiar with fourteen species of ferns, which have been studied in the customary manner, — by means of lantern-slides, pressed specimens, and the ferns growing in the fernery.

Each member of the class has a notebook carefully kept, and containing pinnæ or fronds of every fern studied. Miss L. D. Ellis, a member of the class in 1896, won Mr. Davenport's first prize of fifty choice ferns, at the Herbarium Exhibition in November, 1897.

Excellent opportunities have been found for making lantern-slides from the fern crosiers in different stages of growth as seen in the fernery.

On account of the wetness of the season the plants as a whole have made exceptionally fine growths, especially the asters and golden-rods.

REPORT OF THE MEDFORD SCHOOL GARDENS.

Having once more become associated with the schools of Medford, I have during the past year made an effort to improve the Swan School Garden, and have added a large number of native plants to its flora.

Through the generosity of the Malden Park Commissioners I have been able to enrich the garden, especially the fern beds, with some twenty-five loads of peat mould from Fellsmere, and over two hundred fern roots, interspersed with asters and golden-rods, of different species, have been massed in the beds along the shady side of the fences. The rockery has been restocked with hepaticas, blood-roots, columbines, herb Robert, and other rock-loving plants, with polypodiums, woodsias, marginal shield fern and Christmas fern, and several choice native shrubs have been added to the garden. As, however, I intend adding others in the spring, and contemplate making still further efforts to establish the garden on a permanent basis of usefulness for nature study in the school, I shall not submit a special report for this year.

I wish, however, to call the attention of the Committee to the Curtis School Garden, which is beginning to assume proportions that entitle it to the highest consideration of this Committee.

Under the able supervision of Miss Amy Jones, the principal of the school, and her assistant, Miss Laura Davenport (one of the pioneers of nature work in the Medford schools), the garden has developed from a very modest beginning into a strong competitor for one of the prizes offered by this Committee, and bids fair to become a still more formidable one in the near future.

A large portion of the garden has been devoted to the usual garden flowers for the pleasure of the children, — a practice which I believe to be a wise one where only young children of the first, second, and third grades are concerned, — but some twelve native trees and shrubs and upward of fifty species of native flowering plants and ferns have been grown and made use of in the nature work in the school. Some of the nature work done from studies of these native plants by some of the youngest pupils in the school

has been of unusual excellence, and reflected great credit on the teachers and children.

Among the choice native shrubs are a seedling catalpa from the Swan School Garden, and a fine plant each of *Kalmia latifolia* (mountain laurel) and *Rhododendron maximum*, the gift of Miss Davenport, who resigned her position as teacher in the school in September, in order to assume other duties elsewhere.

The school is fortunate in having for its garden so earnest a worker as Miss Jones, who is striving to improve it in every way that she can; so helpful a sub-committee as Mr. Charles M. Jones; and so appreciative a friend as Superintendent Morss, who holds this work at its true value and encourages it all that he can.

The garden has been put into first-class condition for the winter; new beds have been made for next season's planting; the old beds have been thoroughly fertilized with rich mould, and a number of extra plants already bedded in.

It is Miss Jones's intention to make the garden more useful than ever another year, and she hopes to have some photographs made showing some of the beds and the children at their work.

Respectfully submitted,

GEORGE E. DAVENPORT.

OTHER SCHOOL GARDENS.

The school garden is being recognized in a few places, besides those already mentioned, as a valuable educational adjunct. In the spring one will be started in Stoneham and another in East Braintree. The Superintendent of Schools in the latter place has invited some member of the School Garden Committee to give a talk on the subject in that place.

The Robert G. Shaw Garden will take a new lease of life in the spring, now that the city of Boston finds itself in such a financial condition, after a wearisome period, as to warrant the grading of the grounds.

A letter on the subject of school gardens was received from a very enthusiastic principal living in one of the Gulf States. In some way he came across a copy of the Transactions of this Society, and therein saw an account of a school garden, which kindled his enthusiasm to a high pitch. He solicited advice in regard to laying out a garden an acre in extent. As that was a little

ahead of anything the Committee had contemplated, only a moderate amount of advice could be transmitted to him.

Several school gardens have been established in Trenton, N.J. At various times our reports have been sent to Professor B. C. Gregory, the Superintendent of Schools in that place, and he has sent several letters concerning what has been done in gardening there, and has promised to send a printed report giving additional details of the work.

Two sample letters to him are herewith submitted. From the simple beginnings indicated therein great things may grow; and it is with some pride that we see the influence of the Massachusetts Horticultural Society extending in this particular line to distant places.

TRENTON PUBLIC SCHOOLS,
SCHOOL NO. 8, December 15, 1897.

PROFESSOR B. C. GREGORY:

DEAR SIR: Last Arbor Day the children prepared three flower beds — two circular ones and one along the back fence. They dug out the clay and poor soil, and filled up with good soil brought from quite a distance. They then sowed seed and set out plants, which grew and were carefully looked after by the pupils. They enjoyed the flowers and took great pride in caring for them. There are three fine rose bushes, which will survive the winter, I think.

Respectfully,

M. M. WRIGHT.

TRENTON PUBLIC SCHOOLS,
SCHOOL NO. 15, GIRARD, December 17, 1897.

PROFESSOR B. C. GREGORY:

DEAR SIR: We started a garden, on either side of our school building, last spring, in which the children took a great deal of pride, and the plants were very much admired by all the neighborhood. We were a little afraid that our flowers would be interfered with during the summer, but, instead, the people in the neighborhood were careful that they should not be molested. We intend to extend the work in the spring again.

I am yours very respectfully,

ELIZABETH HUGHES.

CHILDREN'S HERBARIUMS.

It can be truly said that the children's herbariums exhibited November 26 and 27, 1897, considering the number and quality of the specimens, were the best ever placed on exhibition in Horticultural Hall.

More classes of plants were exhibited than at any previous exhibition, flowering plants leading with one thousand and twenty-nine specimens, and ferns coming next with two hundred and eleven specimens. These two classes were the largest ever seen here. Grasses, sedges, rushes, and mosses swelled the whole number to thirteen hundred and sixty-six specimens. For the exhibition of these mounts nearly all the table space in both halls was required.

The Nahant school collection was the most remarkable, both in point of numbers and the quality of the mounting. When the specimen was small by nature, many plants of the same species were artistically arranged on the sheet, so that different forms were shown and the sheet was well covered. A specimen two or three inches long looks lonesome on a sheet eleven by sixteen inches.

Among the collections that call for special mention were those of Lucy D. Ellis, Genevieve Doran, Vanessa Denton, William P. Bates, Marion C. Goward, Roscoe G. Knight, Arthur E. French, and Arthur C. Faxon. The last two exhibitors have shown nearly every common native plant, and many rare ones, during the five or six years they have exhibited.

Mr. Davenport's first prize of fifty native ferns, and the second of twenty-five, attracted marked attention. The former was won by Lucy D. Ellis, and the latter by Arthur E. French. Most fortunately, these two beautiful collections came into the possession of appreciative young botanists.

The attendance was much larger than at any previous exhibition, and in every way satisfactory.

It is remarkable that, notwithstanding the distribution of thousands of circulars and prize lists of the exhibition every year, advertising in three prominent Boston papers, and calling attention to the exhibition at teachers' conventions, so many people, teachers included, stumble as it were into the exhibition, declaring that they never knew anything about the matter before catching a glimpse of a seven-foot poster on each side of the outer door of this Hall.

PRIZES AND GRATUITIES AWARDED FOR SCHOOL GARDENS AND CHILDREN'S HERBARIUMS.

SCHOOL GARDENS.

George Putnam School, Roxbury, first prize	$15 00
Curtis School, Medford, second prize	10 00
Swan School, Medford, gratuity	15 00

CHILDREN'S HERBARIUMS.

FLOWERING PLANTS. — For one hundred and twenty-five specimens, first prize, Roscoe G. Knight	5 00
Second, Genevieve Doran	4 00
For one hundred specimens, first prize, Franklin Lewis	4 00
For seventy-five specimens, first prize, Carl M. True,	3 00
For fifty specimens, first prize, William P. Bates	2 00
Also first, Vanessa Denton	2 00
Gratuities: —	
Nahant School, for school collection of one hundred and eighty-four specimens	6 00
Marion C. Goward, for one hundred and twenty-five specimens	4 00
Arthur C. Faxon, for ninety-five specimens	4 00
Olive E. French, for fifty specimens	1 50
Arthur E. French, for forty-four additions	5 00
FERNS. — For twenty-five specimens, first prize, Marion C. Goward	4 00
For fifteen specimens, first prize, Roscoe G. Knight,	3 00
For ten specimens, first prize, Ada K. Wood	2 00
Second, Olive E. French	1 00
For five specimens, first prize, Clara Hathaway	75
GRASSES.	
Gratuities: —	
Arthur E. French, for eight additions	2 00
Arthur C. Faxon, for two additions	50

SEDGES.

Gratuities: —

Arthur E. French, for two additions	$2 00
Arthur C. Faxon, for five additions	1 00

RUSHES.

Gratuity: —

Arthur C. Faxon, for eight specimens	2 00

LEAF SPRAYS. — For thirty-six sheets, first prize, J. Stanley Webb 3 00

Second, Katharine A. Dwyer	1 00

Gratuities: —

Arthur C. Faxon, for ten additions	1 00
Philip G. Clapp, for ten sheets	50
Total for Herbariums and Gardens	$104 25

The amount of money appropriated by the Society for the use of this Committee was		$250 00
Awarded for School Gardens	$40 00	
Awarded for Herbariums	64 25	
Suffolk Engraving Company (cuts)	10 05	
Printing	42 62	
Advertising	19 60	
Paper	6 21	
Expressage, posters, stamping, etc.	8 50	
		191 23
Balance unexpended		$58 77

HENRY L. CLAPP, Roxbury,
Mrs. H. L. T. WOLCOTT, Dedham,
GEORGE E. DAVENPORT, Medford,
Miss KATHARINE W. HUSTON, Roxbury,
Mrs. P. D. RICHARDS, West Medford,
WILLIAM P. RICH, Chelsea,
W. E. C. RICH, *Secretary*,
99 Moreland st., Roxbury, Mass.,

Committee on School Gardens and Children's Herbariums.

REPORT

OF THE

COMMITTEE OF ARRANGEMENTS

FOR THE YEAR 1897.

The year just about closing has been, as usual, quite gratifying to your Committee, for the reasons that the exhibitions all through the season have been very full, and an unusual interest has been manifested by a large number of new exhibitors. This is greatly to be commended, for the constant addition of new life to any working institution is desirable, since by these additions we come in contact with new and improved modes of cultivation, which are sometimes great improvements over the old methods, and add to our exhibitions an interest which they would not have had except by this new life which is constantly being added by the initiation of new members.

We are also pleased to note the unflagging interest of the gardeners in our shows, for without their hearty coöperation our shows would be utter failures. We are under great obligations to them for their industry and zeal, and we try to repay them, in part, by expending a portion of our appropriation for their comfort and enjoyment.

It is also pleasant to record the great success of the Mycological Club, an auxiliary to our Society, and the enthusiasm manifested by the members in making their shows of wild fungi as large and complete as possible. Their exhibitions have added very largely to the knowledge of the edible species of this class of vegetables, much to the gratification of the lovers of mushrooms.

Taking the Schedule of Prizes as the basis for our action, the halls, tables, etc., have been so arranged as best to bring into view the various collections at each exhibition, and the exhibitors have coöperated so well with your Committee that there has not been any friction or adverse comment on the allotment of space.

This is very gratifying when we take into consideration the very crowded and limited accommodations we have at some of our shows.

We are under still another obligation to our friend Jerome Jones, Esq., for the loan of three very large and elegant china vases for the display of chrysanthemums in November, thus giving us eight large vases to meet all the entries made for these particular prizes.

The exhibitions this year have been quite as numerous as during any former year, and yet at only two of them, the Spring and Chrysanthemum Shows, has any admittance fee been charged. At the end of this report will be found an account of the receipts derived from these exhibitions. These are not as much as your Committee would desire, and surely not nearly as much as it would expect with better accommodations. We are under obligations to the newspapers for copious reports of our shows, but we should be under much greater obligations if they would tell the public what to expect before the shows take place, thereby giving the people an inkling of what is to come off before the shows are all over.

The arrangements of plants and flowers at the different shows have been varied so as to produce the most pleasing effect as a whole, taking into consideration that none of your Committee knows what will be sent in till the contributions reach the hall.

The chairmen of other committees will tell you about the progress we are making in our noble art, and we trust their reports will be read with interest, pleasure, and profit by all our members.

Receipts at Spring Exhibition	$319 75
Receipts at Chrysanthemum Show	654 50
	$974 25

all of which is in the Treasury of the Society.

Respectfully submitted,

JOS. H. WOODFORD,
Chairman.

REPORT OF THE DELEGATE

TO THE

STATE BOARD OF AGRICULTURE

FOR THE YEAR 1897.

It was stated in a previous report that the work of the State Board of Agriculture was divided among sub-committees of the members. The work of the Committee on Gypsy Moth, Insects, and Birds would seem to have special interest for this Society. The present facilities for travel and transportation enable collectors to visit every habitable part of the globe in search for new species and varieties of fruits, flowers, vegetables, ornamental trees and shrubs, with the constant danger of bringing their insect enemies with them. Foreign countries have found it necessary to pass stringent laws requiring all nursery stock to be inspected before being planted or distributed.

Two insects which have proved most destructive in foreign countries have recently been introduced into this State,— the Gypsy Moth and the Brown-tailed Moth. The former was brought here by a Frenchman who, having some knowledge of entomology, thought that by cross-breeding he could produce a more hardy silk-worm than the common species. While carrying on his experiments some of the caterpillars escaped and soon became a serious pest in the neighborhood. He resided in the southern portion of Medford; his neighbors had small places with gardens of limited area containing the usual garden fruits. In 1889 the caterpillars appeared in such quantities as to defy all attempts to destroy them by individual effort. The shade trees in the streets were stripped of their foliage and the fences and the sides and roofs of the houses were covered with the caterpillars. They entered the houses, secreting themselves in the closets and in the beds. The citizens called a special town meeting and appropriated three hundred

dollars, and instructed the Road Commissioners to protect the shade trees. Without experience or the facilities for prosecuting the work, they made little progress. The residents of the infested and adjacent territory decided to petition the Legislature to assist in controlling and, if possible, exterminating this destructive pest. The Governor of the State resided in the infested territory, and in his annual message, January, 1890, called the attention of the Legislature to the matter. Petitions from the Selectmen of Medford and the adjoining towns, Arlington, Everett, Winchester, Stoneham, and Wakefield, from the city officials of Malden and Somerville, the State Board of Agriculture, and the Massachusetts Horticultural Society, were presented to the Legislature in January, 1890. The matter was referred to the Committee on Agriculture. The Committee visited the infested locality and reported that they saw walls of buildings and almost every tree covered with the egg clusters or nests.

The Legislature of 1890 enacted a law providing for the appointment of a commission to take charge of the work "to provide and carry into execution all possible measures to prevent the spread and secure the extermination of the *Ocneria dispar* or Gypsy Moth in this Commonwealth." The Legislature appropriated twenty-five thousand dollars, and the Governor appointed a commission consisting of three men, all residents of the infested territory. They commenced work immediately and killed large quantities of the caterpillars, paying special attention to the trees by the roadsides to prevent their being distributed by passing carriages. The Commission soon found that the money appropriated would not complete the work over the known infested territory, which was supposed to be about a mile and a half long and two-thirds of a mile wide, and the Legislature appropriated twenty-five thousand dollars more. The work of spraying was continued as long as the insect continued in the caterpillar state, and afterwards the eggs were destroyed.

In the spring of 1891 the Governor discharged the Commission and the Legislature passed an act placing the work of attempting "to prevent the spreading and to secure the extermination of the Gypsy Moth" in the hands of the State Board of Agriculture, and appropriated fifty thousand dollars to carry on the work.

The efforts of the Committee the first year were directed to destroying as many as possible of the insects where they were liable

to do the most injury; to cleaning the trees bordering the highways, and scouting to ascertain the outside limits of the area infested. During the year scattered colonies were found in thirty-one different towns and cities, bounded as follows: South by Boston and all the towns bordering on Massachusetts Bay to Beverly; on the east by Beverly, Danvers, and Reading; on the north by Bedford, Lexington, and Waltham, and on the west by Waltham and Watertown.

It was then determined that a line drawn on the outside limits of the above towns enclosed the infested territory, and from that time to the present only three colonies have been found outside the above-named limits. Two colonies have been found in Brookline and one in Lincoln.

It will not be understood that all the above territory was infested, but scattered colonies were found, diminishing in number in proportion to the facilities for transportation and the distance from the centre at Medford.

The plan of work pursued from the beginning has been to work from the outside towards the centre for extermination, and reduce the infested area, and, as far as means allowed, to reduce the numbers in the central portions, and to clean trees bordering highways and railroads.

The Committee have each year at the close of the season made a careful survey of the work done and to be done, and if the work was to be continued asked for the least amount of money to do the work absolutely necessary when viewed from an economic standpoint. These estimates have been reduced by the Legislature from one-third to one-half, thus causing a change of plans by which portions of the territory must be neglected; and so rapidly does this insect increase, that small colonies become large ones, and others that were greatly reduced, not only regain their former number and extent of ground occupied, but add largely to both.

As an illustration of the fecundity of this insect, I will mention one instance. While making an examination of one of the woodland colonies the past season, an oak tree ten inches in diameter, and from forty to fifty feet in height, was noticed as being thickly covered with nests, and the workmen were requested to count these nests as they destroyed them, and report the number. They reported two thousand and seventy. It has been found by the

examination of these nests that they contain on the average between five and six hundred eggs. This single tree was carrying through the winter a prospective increase of one million and thirty-five thousand caterpillars in one year. It has been found that ten full-grown caterpillars weigh an ounce, but allowing twenty to the ounce, the above number would weigh more than one and one-half tons. They are omnivorous, eating the foliage from every known tree, plant, and vegetable. They commence hatching about the twentieth of April, and continue until the middle of June, and feed until the last of July.

Strong colonies, if undisturbed, will kill most deciduous trees in two years, and evergreen trees in one year. They not only destroy the first foliage, but continue as the trees put forth new foliage to devour it until the last of July.

The difficulty, if not the impossibility, of controlling this insect by ordinary methods has been illustrated in many instances. General Lawrence, of Medford, stated before a committee of the Legislature that he spent more than three thousand dollars in a single season in his efforts to protect his own premises, but failed, and was obliged to call on the State employees for assistance.

Congress, at its last session, passed an act requiring the United States Department of Agriculture to make an investigation of the gypsy moth in Massachusetts. In accordance with that act, L. O. Howard, the head of the Entomological Division, has spent several weeks in making a thorough examination of the whole territory and the methods of work employed by the Committee for the extermination of this insect. His report is now in the publisher's hands, and will soon be issued, and may be relied upon as the judgment of one of the most expert economic entomologists in the country.

This war on the gypsy moth is not for the protection of Massachusetts alone, for if the work is discontinued, and they are allowed to increase along the highways and railroads, they must inevitably be carried into other States; and, judging from our experience in Massachusetts, we shall have the most dangerous and destructive national insect pest ever introduced into this country.

E. W. Wood,
Delegate.

REPORT

TO THE

STATE BOARD OF AGRICULTURE

FOR THE YEAR 1897.

By GEORGE CRUICKSHANKS, OF FITCHBURG.

In 1829 the Massachusetts Horticultural Society was organized to encourage the science and art of horticulture. How well it has fulfilled its mission may be seen at the exhibitions that are held at its beautiful hall on Tremont Street almost every Saturday during the year. Besides the Annual Spring, Rhododendron, Rose and Strawberry, Plant and Flower, Fruit and Vegetable, and Chrysanthemum Shows, prizes are offered every week during the summer and autumn months for the choicest products of the gardener's skill. The amount appropriated this year for premiums and gratuities was $8,100.

The year began with a course of Lectures and Discussions on the following subjects:

January 9. Tropical Horticulture, with Illustrations of the Principal Economic Plants of Hot Climates, by Professor George L. Goodale, Cambridge.

January 16. The Structure and Classification of Mushrooms, by Hollis Webster, Cambridge.

January 23. The Chrysanthemum; its Past, Present, and Future, by Edmund M. Wood, Wellesley.

January 30. Plant Beauty, by Henry T. Bailey, North Scituate.

February 13. Sweet Peas, by Rev. W. T. Hutchins, Indian Orchard.

February 20. Market Gardening, by T. Greiner, La Salle, N.Y.

February 27. Good Food from the Garden, by Miss Anna Barrows, Boston.

March 13. Horticulture in Canada, by Professor William Saunders, Ottawa, Canada.

March 20. Soils and Potting, by T. D. Hatfield, Wellesley.

March 27. The Spread of Plant Diseases; a consideration of some of the ways in which Parasitic Organisms are disseminated, by Dr. Erwin F. Smith, Washington, D.C.

The lectures and discussions are published in full in the Transactions of the Society, which are free to all the members of the Society.

The Spring Exhibition opened March 23 and continued four days. The Lower Hall contained a fine show of early vegetables and winter apples and pears. In the centre of the hall was a rich display of spring flowering greenhouse plants. In the Upper Hall were choice collections of spring flowering bulbs, which included the fragrant hyacinth, tulips, jonquils, narcissuses, and polyanthuses. There were excellent exhibits of perennials, cinerarias, cyclamens, and pansies, and a fine show of orchids.

The Rhododendron Show opened June 3 for two days. The rhododendrons and azaleas were very fine. Fine exhibits were made of carnations, foxgloves, oriental poppies, etc. There were large collections of native plants and an excellent display of orchids. One table was filled with a choice collection of vegetables. A tomato plant grafted on a potato and bearing potato tubers at the bottom and a tomato at the top attracted much attention.

The Rose and Strawberry Show was held June 22 and 23. The exceedingly cold and rainy spring was not favorable to the growth of the best quality of either fruit or flowers; consequently the display was not large and the quality was not as good as in some former years. In strawberries the Marshall took the lead in size and quality. Beautiful collections of orchids were shown; also a very fine specimen (trained) of Bougainvillea, large collections of rhododendrons, and an exhibit of seventy-two varieties of pæonies.

The Annual Exhibition of Plants and Flowers was held September 1 and 2. All lovers of flowers look forward to this annual plant and flower show. The Upper Hall was devoted to pot plants. Much credit is due the Committee of Arrangements for the taste

shown in arranging the pot plants in groups on the floor of the hall. All the stove, greenhouse, and foliage plants were in the best possible condition. The tanks of water plants near the entrance to the Upper Hall were very much admired. The Lower Hall was devoted to a splendid display of cut flowers. There was a very large show of dahlias on the tables and a solid bank on the platform at the end of the hall. Large collections of zinnias, marigolds, dianthuses, French cannas, native flowers, etc., were shown. The annual plant and flower show of 1897 was one of the best held by the Society.

The Annual Exhibition of Fruits and Vegetables began September 30, to hold two days. The show of apples was not as large as that of some years, but many fine specimens were on the tables, the Roxbury Russet, Washington Strawberry, and McIntosh Red being worthy of special mention. The show of pears was very fine, and many of the varieties were fully up to the high standard held by this Society. Peaches were excellent. Native grapes were good, notwithstanding the cold and rainy season. A novelty in the exhibition was a collection of seventeen varieties of edible nuts. The display of vegetables was abundant and of excellent quality. One long table was devoted to the squash family; another to potatoes, beets, onions, parsnips, and carrots. There was an interesting collection of culinary herbs, comprising twenty varieties, many of which are seldom seen at our exhibitions.

The Chrysanthemum Show began November 2, to continue four days. The Upper Hall was given up to the display of pot plants placed in groups on the floor. Here the gardener had a chance to show his taste in arranging for effect, each being allowed one hundred square feet. The plants were all well grown, and good taste was shown in the arrangement. The Lower Hall was devoted to the cut flowers on tables and in vases, every available space being filled with the finest display of the chrysanthemum ever shown in Horticultural Hall. Besides the chrysanthemums there was a fine show of orchids and carnations.

Respectfully submitted,

GEO. CRUICKSHANKS,

Inspector.

REPORT

OF THE

COMMITTEE ON THE LIBRARY

FOR THE YEAR 1897.

As usual, we find little to say about the affairs of the Library; the same report would suffice year after year with the alteration of a few words. The sums of money which we have received from the Society and from the income of the Stickney Fund have been expended in the usual way, and the increase of the Library by purchase has been about the same as in previous years. The Librarian's list will contain all the titles, and it is not necessary, therefore, to make especial mention of many. The most important of the works which we have been receiving part by part, Sargent's "Silva of North America," is now complete with the exception of two volumes, one of which will probably be at hand by the end of the year.

The books and pamphlets which we have obtained otherwise than by purchase have been as numerous as those we have bought; and we would make especial mention of a beautiful book presented by Mr. James Herbert Veitch, F.L.S., F.R.H.S., of the firm of James Veitch & Sons, descriptive of his journeys in the East and in Australia and New Zealand. The work is very valuable, not only for its text, but its illustrations, and is, moreover, a book which we could not easily have come by, since it was printed for private circulation only and not for distribution by the trade.

A year ago we stated that the regular force of the Library would probably be able to do the needful work upon the card catalogue of plates in the future. This expectation seems to have been well founded, and much of this work has been done in the past year. We regard this catalogue as a possession as valuable as it is unique; when we look at this great array of drawers

filled with cards, many of which contain three or four references, and remember that not one of these hundreds of thousands is included in Pritzel's Index, we see at a glance one proof of the completeness of our library and its accompanying key, which fully doubles its value. One thing more is lacking, which we hope may some day be supplied; namely, a similar index to subjects.

In regard to the suggestion made during the present year "that the Committee on the Library shall make a rule limiting the time during which books can be kept from the Library room," we wish to say that Regulations for the Library were adopted on the 13th of March, 1830; which regulations were revised in 1846 and again in 1861. In every case they included a rule fixing the time during which books taken from the Library might be kept. These rules provide that a copy shall be affixed to every book, and that this is done may be seen by any one who will take the trouble to examine.

For the Committee,

W. E. ENDICOTT,
Chairman.

REPORT

OF THE

SECRETARY AND LIBRARIAN

FOR THE YEAR 1897.

In attempting to write a report of the work in this department during the year now closing, I am confronted with the same difficulty which has been encountered in former years — the fact that the work of one year is so similar to that of another, though never precisely the same in its details, that the report of one year must necessarily bear a strong general resemblance to that of another.

The Schedule of Prizes was, as I hoped when I presented my last report that it would be, ready and sent by mail with other documents to every member some days before the close of the year, and I trust that we may be able to do the same with the Schedule for 1898.

The publication, since my last report, of the List of Library Accessions in a separate pamphlet, as Part III. of the Transactions for 1895, affords a better opportunity than ever before to judge of the rapidity with which the Library is growing. The first publication of the full list of additions to the Library was in 1860, when it filled about two pages; in 1895 it filled sixty pages. Since my last report Part II. of the Transactions for 1896 has also been completed and published. As soon as I could see my way through these two publications, that of Part I. for 1897 was taken in hand. Four of the lecturers in the winter course having taken their papers home for revision, the first thing to be done was to recall these, and this was attempted early in June. One was received quite promptly; another, after three written requests, came to hand about the first of August, and a third a little later; but the fourth, notwithstanding many and urgent requests, was received only yesterday. Being one of the earliest in the course, it blocked the printing of all

the others; but the beginning of that part of the Transactions is now in the printer's hands and it will be completed as speedily as possible.

In my report as Librarian for 1895 I remarked that the work of binding the Agricultural Newspapers, which for the previous five years had been preserved as permanent additions to the Library, should not be much longer delayed. I am glad to be able now to report that during the present year sixty-two volumes of this class have been bound. Although this is not a great number, and though the cheapest bindings consistent with strength and durability were selected, the books were of so large size that the expense absorbed a considerable part of the library appropriation. The next heavy work in the way of binding is our large collection of Experiment Station Reports; this will be done as soon as time and funds permit.

The great interest in mushrooms the last two or three years induced the Library Committee to add to those already in the Library a selection of works on that subject, some of which are illustrated with colored plates. These books have afforded much gratification to members of the Society and others who are studying that class of plants.

Among other additions to the Library is a volume containing the anniversary addresses and other publications of the Society from its beginning in 1829 to 1837 inclusive. Although the Society already possessed copies of all these publications, interest is added to this volume by the fact that the pamphlets containing them were collected by the first President, General Dearborn, and that the volume has a title page, preface, and table of contents in his handwriting, the preface being signed by him and giving an account of the inception of the Society and the establishment by it of Mount Auburn Cemetery. There is also a copy of two circulars sent out to call the meetings which resulted in the formation of the Society, and a copy of the Order of Exercises at the Consecration of Mount Auburn. This unique volume was the gift of Edward C. R. Walker, whose lamented death on the 11th of October last has added to its value.

The work of completing imperfect sets has been steadily pursued. Our set of the Farmer's Magazine in ninety-three volumes, London, 1834–1881, has been completed by the fortunate purchase of the first nine volumes. In years past we have printed in connection

with the List of Library Accessions a list of books, etc., wanted, the last having been in 1883. It has every year since then been my desire to print another, but it has been omitted because the time required to prepare it would delay the publication of the Transactions. But with the publication of the Library Accessions in a separate pamphlet this objection no longer existed, and accordingly such a list was included in that pamphlet, and many of the books in it have already been procured, especially the publications of the United States Department of Agriculture, making our set of those publications complete with very few exceptions.

The extension of the usefulness of the Library among members of the Society and others has been kept constantly in mind, and a circular, intended to promote this object, signed by the President, was sent to every member of the Society and a large number of its correspondents, and still wider circulation was given to it by some of the leading horticultural and daily newspapers.

No special appropriation for the work on the Card Catalogue of Plates was made this year, but it has been carried on as far as possible by those regularly employed here.

One of the most vital portions of the Library, which makes us sharers in the horticultural progress of the day, is the periodicals supplied by the Society's appropriation, and by exchange for our own publications. These, which are ever growing in number, not only keep us informed as to the latest discoveries in horticulture, but when bound form a valuable, and not inconsiderable, permanent part of the annual accessions; indeed, with other publications received by donation and exchange, they constitute the bulk of these annual additions. Another most valuable class of books is supplied by the Stickney Fund, but the interest of the Society in this fund expires with the present year, and it is much to be hoped that among the members and friends of the Society there may be found one possessing the means and disposition to establish a fund for the increase of the Library, which shall take the place of the Stickney Fund, and shall be a perpetual possession.

The fact that only three weeks after the organization of the Society a Committee on the Library was established to collect books, drawings, engravings, etc., relating to horticulture, shows the estimate attached by the founders of the Society to the importance of a library. After a time, however, the interest in the Library seemed to flag, but later, owing to the diligent

labors of the Library Committee and the gift of Mr. Stickney, it was revived, and the Library may now claim to be of fully equal importance with any department of the Society; indeed, as an educational influence, it may justly claim greater importance than any other department. The Library and the annual courses of lectures, only, can give the Society any claim to be considered a scientific institution. No more beautiful sight is afforded anywhere, or at any time, than the specimens of plants, flowers, fruits, and vegetables contributed in such perfection to the various exhibitions of this Society; but though they may excite in the beholders a desire to go and do likewise, in themselves they afford no information how to do it. The money spent in prizes and gratuities for these beautiful productions is doubtless productive of much good, but its permanent benefit, both to individuals and to the Society, is but small compared with that derived from a well stocked and carefully selected library, for that benefit is permanent and continually increasing.

The Library of the Royal Botanic Gardens, at Kew, is thought to be the best botanical library in the world, and there can be no better judge of such a library, both from a practical and scientific point of view, than Mr. George Nicholson, the Curator of the Gardens, author of the "Illustrated Dictionary of Gardening," and a Corresponding Member of this Society. When looking over our Library a few years ago, he exclaimed, "It is wonderful — it is wonderful — it is something that not only the State, but the whole nation, should be proud of!"

ROBERT MANNING,
Secretary and Librarian.

DECEMBER 18, 1897.

TREASURER'S REPORT

FOR THE YEAR 1897.

MASSACHUSETTS HORTICULTURAL SOCIETY *in account current to December 31, 1897, with* CHARLES E. RICHARDSON, *Treasurer.*

DR.

To amount paid on account of Library in 1897:			
For books, periodicals, and binding . . .		$400 00	
From income of Stickney Fund for books	$733 54		
Less amount received from sale of duplicate books	50 00		
		683 54	
			$1,083 54
To amounts paid Interest on Funds for Prizes credited opposite			1,892 72
To amounts paid Interest on Loans			928 50
To Prizes awarded in 1896 paid in 1897 as follows:			
For Plants		$1,963 53	
" Flowers		2,528 19	
" Fruits		1,476 00	
" Vegetables		1,071 00	
" Gardens and Greenhouses		480 00	
" Hunnewell Prizes for Rhododendrons . .		105 00	
			7,623 72
To amount paid Committee on School Gardens and Children's Herbariums			191 23
" " Salaries, Secretary, Assistants, and Treasurer		$4,200 00	
" " Salaries of Committees . . .		1,351 00	
" " Services on Transactions . . .		107 00	
" " Committee of Arrangements . .		400 00	
" " Insurance		1,004 70	
" " Repairs		248 76	
" " Furniture and Exhibition Ware .		657 34	
" " Heating		968 62	
" " Lighting		591 38	
" " Water Rates		354 00	
Amounts carried forward		$9,882 80	$11,719 71

Amounts brought forward	$9,882 80	$11,719 71
To amount paid Publication and Discussion .	280 00	
" " Stationery, Printing, and Postage .	1,370 30	
" " Taxes	2,756 00	
" " Legal Services	1,170 00	
" " Incidentals	679 73	
" " Labor, including Janitor's Salary .	2,678 97	
" " Annual Exhibitions, Expenses . .	462 57	
" " H. H. Hunnewell	1,000 00	
" advanced to A. P. Loring, Executor .	15,000 00	
		35,280 37
		$47,000 08
Balance of Cash, December 31, 1897		6,664 89
		$53,664 97

CR.

By Balance of account rendered December 31, 1896			$6,600 61
Received from Building in 1897, viz.:			
Rents of Stores	$15,931 67		
" Halls	2,050 00		
		$17,981 67	
Received Income from Mount Auburn		4,682 64	
" Massachusetts State Bounty		600 00	
" Admissions and Assessments		1,132 00	
" Annual Exhibitions, Gross Receipts		974 25	
" Interest on Bonds	$1,075 00		
" " Bank Balance	44 58		
" " other sources	110 00		
		1,229 58	
" from sales of Transactions		2 00	
" " H. H. Hunnewell, prizes for 1896		32 00	
" " Heating		338 50	
" " Water Rates		199 00	
" Interest credited following Funds charged opposite:			
Samuel Appleton Fund	$50 00		
John A. Lowell Fund	50 00		
Theodore Lyman Fund	550 00		
Josiah Bradlee Fund	50 00		
Benjamin V. French Fund	25 00		
H. H. Hunnewell Fund	200 00		
W. J. Walker Fund	117 72		
Levi Whitcomb Fund	25 00		
Benjamin B. Davis Fund	25 00		
Marshall P. Wilder Fund	50 00		
John Lewis Russell Fund	50 00		
Josiah Stickney Fund, as agreed	700 00		
		1,892 72	
Notes Payable		18,000 00	
			47,064 86
			$53,664 97

CHAS. E. RICHARDSON,
Treasurer.

Approved:
H. H. HUNNEWELL,
A. HEMENWAY,
FRANCIS H. APPLETON,
} *Finance Committee.*

ASSETS AND LIABILITIES OF THE MASSACHUSETTS HORTICULTURAL SOCIETY.

DECEMBER 31, 1897.

ASSETS.

Real Estate	$250,000 00	
Stereotype Plates and copies of History	257 00	
Chicago, Burlington & Quincy R.R. Bonds	1,000 00	
Sinking Fund	23,872 50	
Kansas City, Clinton & Springfield R.R. Bonds	1,980 00	
Furniture and Exhibition Ware	7,650 75	
A. P. Loring, Executor	22,500 00	
Library	36,980 78	
Due from Tenants	2,641 79	
Cash	6,664 89	
		$353,547 66

LIABILITIES.

Mortgage		$1,000 00	
Notes Payable		18,000 00	
Josiah Stickney Fund, payable to Harvard College in 1899		12,000 00	
Unexpended balance of Josiah Stickney Fund		32 74	
Prize Funds invested in Building, viz.:			
Samuel Appleton Fund,	$1,000 00		
John A. Lowell "	1,000 00		
Theodore Lyman "	11,000 00		
Josiah Bradlee "	1,000 00		
Benjamin V. French "	500 00		
William J. Walker "	2,354 43		
Levi Whitcomb "	500 00		
Benjamin B. Davis "	500 00		
H. H. Hunnewell "	3,000 00		
	$20,854 43		
Prize Funds invested in Bonds:			
H. H. Hunnewell Fund,	$1,000 00		
Marshall P. Wilder "	1,000 00		
John Lewis Russell "	1,000 00		
	3,000 00		
		23,854 43	
Prizes for 1897, payable in 1898		8,100 00	
			62,987 17
Surplus			290,560 49
			$353,547 66

CHAS. E. RICHARDSON,
Treasurer.

Membership Account of the Massachusetts Horticultural Society, December 31, 1897.

Life Members per last report	554		
Added in 1897	15		
Commuted from Annual	6		
		575	
Deceased		26	
			549
Annual Members per last report	212		
Added in 1897	19		
		231	
Commuted to Life	6		
Deceased	2		
Resigned	5		
Dropped for non-payment, two years	6		
		19	
			212
Present Membership			761

INCOME FROM MEMBERSHIP.

15 new Life Members @ $30	$450 00
19 new Annual Members @ $10	190 00
6 commuted to Life @ $20	120 00
Annual Assessments	372 00
	$1,132 00

CHAS. E. RICHARDSON,
Treasurer.

Dr. *Massachusetts Horticultural Society in account with the Proprietors of the Cemetery of Mount Auburn.* Cr.

For Sales and Improvements within the Cemetery for the year ending December 31, 1897.

To cost of filling up and improving land at Mount Auburn for the year ending December 31, 1897:			By sales in January		$91 60
Vinca Path and Maple Avenue	$466 50		" " February		40 00
Yew and Fountain Avenues	2,027 62		" " March		1,470 00
	$2,494 12		" " April		760 00
One-quarter of $2,494.12 is	$623 53		" " May		2,504 77
Omitted, account, 1896	19 50		" " June		836 00
		$643 08	" " July		1,447 00
Balance due Mass. Horticultural Society		4,682 64	" " August		852 00
			" " September		1,520 00
			" " October		1,560 00
			" " November		9,823 33
			" " December		690 00
					$21,594 70
			Net amount received from Receiving Tomb		1,133 00
					$22,727 70
			Less grave repurchased		25 00
					$22,702 70
			Deduct for annual expenses		1,400 00
					$21,302 70
		$5,325 67	Mass. Horticultural Society ¼ part of $21,302.70		$5,325 67

E. & O. E.

H. B. MACKINTOSH, *Treasurer.*

DECEMBER 31, 1897.

MASSACHUSETTS HORTICULTURAL SOCIETY

To the PROPRIETORS OF THE CEMETERY OF MOUNT AUBURN, *Dr.*

For one-fourth part of the following expenditures for grading new lands for sale during the year 1897:

Vinca Path and Maple Avenue.

34 days, men	$876 50	
104 days, man and horse	390 00	
		$466 50

Yew and Fountain Avenues.

198½ days, men	$446 06	
421¾ days, man and horse	1,581 56	
		2,027 62
		$2,494 12
One-fourth of $2,494.12 is		$623 53

Signed, JAMES C. SCORGIE,
Superintendent Mount Auburn Cemetery.

DECEMBER 31, 1897.

I certify the foregoing to be a true copy of improvements for the year 1897 rendered by the Superintendent.

H. B. MACKINTOSH,
Treasurer.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1898.

President.

FRANCIS H. APPLETON, of Peabody.

Vice-Presidents.

CHARLES H. B. BRECK, of Brighton. BENJAMIN P. WARE, of Clifton.
WALTER HUNNEWELL, of Wellesley. SAMUEL HARTWELL, of Lincoln.

Treasurer and Superintendent of the Building.

CHARLES E. RICHARDSON, of Cambridge.

Secretary and Librarian.

ROBERT MANNING, of Salem.[1]

Professor of Botany and Vegetable Physiology.

BENJAMIN M. WATSON, of Jamaica Plain.

Professor of Entomology.

SAMUEL H. SCUDDER, of Cambridge.

Delegate to the State Board of Agriculture.

E. W. WOOD, of West Newton.

[1] Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

STANDING COMMITTEES.

Executive.

THE PRESIDENT, FRANCIS H. APPLETON, CHAIRMAN.
THE CHAIRMAN OF THE FINANCE COMMITTEE, H. H. HUNNEWELL, *Ex officio.*

WILLIAM C. STRONG. BENJAMIN C. CLARK.
WILLIAM H. SPOONER. WALTER HUNNEWELL.
NATHANIEL T. KIDDER. CHARLES W. PARKER.
CHARLES F. CURTIS.

Finance.

H. HOLLIS HUNNEWELL, OF BOSTON, CHAIRMAN.
FRANCIS H. APPLETON. AUGUSTUS HEMENWAY.

Lectures and Publication.

BENJAMIN M. WATSON, OF JAMAICA PLAIN, CHAIRMAN.
JAMES H. BOWDITCH. AARON LOW.

Library.

WILLIAM E. ENDICOTT, OF CANTON, CHAIRMAN.
GEORGE W. HUMPHREY. GEORGE E. DAVENPORT.
WALTER S. PARKER. CHARLES W. SWAN.

Plants.

AZELL C. BOWDITCH, OF SOMERVILLE, CHAIRMAN.
JAMES COMLEY. WILLIAM J. MARTIN.
JAMES WHEELER. ARTHUR H. FEWKES.

Flowers.

J. WOODWARD MANNING, OF READING, CHAIRMAN.
MICHAEL H. NORTON. FREDERICK S. DAVIS.
KENNETH FINLAYSON. GEORGE E. DAVENPORT.

Fruits.

E. W. WOOD, OF WEST NEWTON, CHAIRMAN.
CHARLES F. CURTIS. WARREN FENNO. J. WILLARD HILL.
O. B. HADWEN. SAMUEL HARTWELL. SUMNER COOLIDGE.

Vegetables.

CHARLES N. BRACKETT, OF WATERTOWN, CHAIRMAN.
CEPHAS H. BRACKETT. VARNUM FROST. WALTER RUSSELL.
P. G. HANSON. WARREN H. HEUSTIS. AARON LOW.

Gardens.

PATRICK NORTON, of Dorchester, Chairman.
CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND ARRANGEMENTS, *Ex officiis.*
HENRY W. WILSON. JACKSON DAWSON.

For Establishing Prizes.

WILLIAM J. STEWART, of Winchester, Chairman.
CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis.*
MRS. P. D. RICHARDS.

Committee of Arrangements.

JOSEPH H. WOODFORD, of Boston, Chairman.
CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis.*
ROBERT FARQUHAR.

MEMBERS FOR LIFE.

Members of the Society and all other persons who may know of deaths, changes in residence, or other circumstances showing that the following list is incorrect in any particular, will confer a favor by promptly communicating to the Secretary any needed corrections.

Information, or any clew to it, is especially desired in regard to members whose names are marked thus †.

Adams, Luther, Newton.
Alger, Rev. R. F., Becket.
Allen, Hon. Charles H., Lowell.
Ames, Frank M., Canton.
Ames, George, Boston.
Ames, Oakes, 2d, North Easton.
Ames, Preston Adams, Boston.
Amory, Charles, Boston.
Amory, Frederick, Boston.
Andrews, Charles L., Milton.
Andrews, Frank W., Washington, D.C.
Andros, Milton, San Francisco, Cal.
Appleton, Edward, Wakefield.
Appleton, Francis H., Peabody.
Appleton, William S., Boston.
Ash, John, Pomfret Centre, Conn.
Atkins, Edwin F., Belmont.

Bailey, Jason S., West Roxbury.
Bancroft, John C., Boston.
Banfield, Francis L., M.D., Worcester.
Barber, J. Wesley, Newton.
Barnard, James M., Boston.
Barnard, Robert M., Everett.
Barnes, Walter S., Somerville.
† Barney, Levi C., Boston.
Barratt, James, Ballard Vale.
Barrett, Edwin S., Concord.
Barry, John Marshall, Boston.
Barry, William C., Rochester, N.Y.
Bartlett, Edmund, Newburyport.
Beal, Leander, Boston.
Becker, Frederick C., Cambridge.
Beckford, Daniel R., Jr., Jamaica Plain.
Beebe, E. Pierson, Boston.
Beebe, Franklin H., Boston.
Beebe, J. Arthur, Boston.
Berry, James, Brookline.
Blake, Francis, Weston.
Blake, Frederick A., Rochdale.
Blakemore, John E., Roslindale.
Blanchard, John W., Dorchester.
Blinn, Richard D., Chicago, Ill.
Bliss, William, Boston.
Boardman, Samuel M., Hyde Park.
Bôcher, Prof. Ferdinand, Cambridge.
Bockus, Charles E., Dorchester.
Bosler, Frank C., Carlisle, Penn.
Bowditch, Azell C., Somerville.
Bowditch, Charles P., Jamaica Plain.
Bowditch, Ernest W., Milton.
Bowditch, James H., Brookline.
Bowditch, Nathaniel I., Framingham.
Bowditch, William E., Roxbury.
Bowker, William H., Boston.
Brackett, Cephas H., Brighton.
Brackett, Charles N., Watertown.
Bresee, Albert, Hubbardton, Vt.
Brewer, Francis W., Hingham.

Briggs, William S., Lincoln.
Brigham, William T., Honolulu, Hawaii.
Brooks, J. Henry, Milton.
Brown, Alfred S., Jamaica Plain.
Brown, Charles E., Yarmouth, N.S.
Brown, Edward J., Weston.
Brown, George Barnard, Brookline.
Brown, John T., Newburyport.
Bullard, John R., Dedham.
Burlen, William H., Boston.
Burnett, Harry, Southborough.
Burr, Matthew H., Hingham.
Buswell, Frank E., Brooklyn, N.Y.
Butler, Aaron, Wakefield.
Butler, Edward K., Jamaica Plain.

Cabot, Edward C., Brookline.
†Cadness, John, Flushing, N.Y.
Cains, William, South Boston.
Calder, Augustus P., Boston.
Cameron, Robert, Cambridge.
Campbell, Francis, Cambridge.
Capen, John, Boston.
Carlton, Samuel A., Boston.
Carr, Hon. John, Roxbury.
Carter, Charles N., Boston.
Carter, Miss Maria E., Woburn.
Cartwright, George, Dedham.
Chadbourne, Marshall W., Mount Auburn.
Chaffin, John C., Newton.
Chamberlain, Chauncy W., Boston.
Chase, Andrew J., Lynn.
Chase, Daniel E., Somerville.
Chase, George B., Dedham.
Chase, William M., Dorchester.
Cheney, Amos P., Natick.
Cheney, Mrs. Elizabeth S., Wellesley.
Childs, Nathaniel R., Boston.
Choate, Charles F., Southborough.
Christie, William, Newton.
Claflin, Hon. William, Newtonville.
Clapp, Edward B., Dorchester.
Clapp, James H., Dorchester.
Clapp, William C., Dorchester.
Clark, Benjamin C., Boston.
Clark, B. Preston, Cohasset.
Clark, Miss Eleanor J., Pomfret Centre, Conn.
Clark, J. Warren, Rockville.
Clarke, Miss Cora H., Boston.
Cleary, Lawrence, West Roxbury.
Clough, Micajah Pratt, Lynn.
Cobb, Albert A., Brookline.
Cobb, John C., Milton.
Coburn, Isaac E., Everett.
Codman, James M., Brookline.
Codman, Ogden, South Lincoln.
Collamore, Miss Helen, Boston.
Converse, Elisha S., Malden.
Converse, Parker L., Woburn.
Coolidge, Joshua, Mount Auburn.
Cottle, Henry C., Boston.
Cowing, Walter H., West Roxbury.
Cox, Thomas A., Dorchester.
Coy, Samuel I., Boston.
Crawford, Dr. Sarah M., Roxbury.
Crocker, Miss S. H., Boston.
Crosby, George E., West Medford.
†Crowell, Randall H., Chelsea.
Cummings, Hon. John, Woburn.
Curtis, Charles F., Jamaica Plain.
Cushing, Livingston, Weston.
Cushing, Robert M., Boston.

†Daggett, Henry C., Boston.
Dana, Charles B., Wellesley.
Davenport, Albert M., Watertown.
Davenport, Edward, Dorchester.
Davenport, George E., Medford.
Davenport, Henry, New York.
Davis, John, Lowell.
Dawson, Jackson, Jamaica Plain.
Day, William F., Roxbury.
Dee, Thomas W., Mount Auburn.
Denny, Clarence H., Boston.
Denton, Eben, Dorchester.
Dewson, Francis A., Newtonville.
Dexter, F. Gordon, Boston.
Dickerman, George H., Somerville.
Dike, Charles C., Stoneham.
Doliber, Thomas, Brookline.

Donald, William, West Roxbury.
Dorr, George, Dorchester.
Dove, George W. W., Andover.
Dowse, William B. H., West Newton.
Draper, Hon. Eben S., Hopedale.
Dreer, William F., Philadelphia, Pa.
Dumaresq, Herbert, Chestnut Hill.
Dunlap, James H., Nashua, N.H.
Durant, William, Boston.
Durfee, George B., Fall River.
Dutcher, Frank J., Hopedale.

Eaton, Horace, Cambridge.
Edgar, William W., Waverly.
Eldredge, H. Fisher, Boston.
†Eldridge, E. H., Roxbury.
Ellicott, Joseph P., Boston.
Elliot, Mrs. John W., Boston.
Elliott, William H., Brighton.
Endicott, William, Jr., Boston.
Endicott, William E., Canton.
Estabrook, Arthur F., Boston.
Everett, William, Dorchester.
Ewell, Warren, Dorchester.

Fairchild, Charles, Boston.
Falconer, William, Pittsburgh, Pa.
Farlow, Lewis H., Newton.
Farnsworth, Mrs. William, Dedham.
Farquhar, James F. M., Roslindale.
Farquhar, John K. M. L., Roxbury.
Farquhar, Robert, Boston.
Faxon, John, Quincy.
Fewkes, Arthur H., Newton Highlands.
Finlayson, Kenneth, Brookline.
Fisher, James, Roxbury.
Flagg, Augustus, Boston.
Fletcher, George V., Belmont.
Fletcher, J. Henry, Belmont.
Fletcher, John W., Chelsea.
Flint, David B., Boston.
Foster, Francis C., Cambridge.
Fottler, John, Jr., Dorchester.
Fowle, George W., Jamaica Plain.
Fowle, William B., Auburndale.
French, J. D. Williams, Boston.
French, Jonathan, Boston.
French, S. Waldo, Jamaica Plain.
French, W. Clifford, Newton.
Frohock, Roscoe R., Malden.

Galloupe, Charles W., Swampscott.
Galvin, John, Boston.
Gardner, George A., Boston.
Gardner, George P., Boston.
†Gardner, Henry N., Mount Auburn.
Gardner, John L., Brookline.
Gibbs, Wolcott, M.D., Newport, R.I.
Gill, George B., Medford.
Gillard, William, Harrison Square, Dorchester.
Gilmore, E. W., North Easton.
Gilson, F. Howard, Reading.
Glover, Joseph B., Boston.
Goddard, A. Warren, Brookline.
Goddard, Joseph, Sharon.
Goddard, Mrs. Mary T., Newton.
Goodell, L. W., Dwight.
Gorham, James L., Jamaica Plain.
†Gould, Samuel, Boston.
Gowing, Mrs. Clara E., Kendall Green.
Gray, James, Wellesley.
Gregory, Hon. James J. H., Marblehead.
Greig, George, Toronto, Ontario.
Grey, Benjamin, Malden.
Guild, J. Anson, Brookline.

Hadwen, Obadiah B., Worcester.
Hale, James O., Byfield.
Hall, Edwin A., Cambridgeport.
Hall, George A., Chelsea.
Hall, George R., M.D., Warren, R.I.
Hall, Osborn B., Malden.
Hall, William F., Brookline.
Halliday, William H., South Boston.
Hammond, Gardiner G., New London, Conn.
Hammond, George W., Boston.
Hanson, P. G., Woburn.
†Harding, George W., Arlington.
Harding, Louis B., Stamford, Conn.

Hardy, F. D., Cambridgeport.
Harris, Charles, Cambridge.
Harris, Thaddeus William, A.M., Keene, N H.
Harwood, George Fred, Newton.
Haskell, John C., Lynn.
Hastings, Levi W., Brookline.
Hatch, Mrs. C. S., North Cambridge.
Hatch, Edward, Boston.
Hathaway, Seth W., Marblehead.
Hawken, Mrs. Thomas, Rockland, Me.
†Hazeltine, Hazen, Boston.
Hemenway, Augustus, Canton.
Henshaw, Joseph P. B., Boston.
Hews, Albert H., North Cambridge.
Hilbourn, A. J., Boston.
Hill, John, Stoneham.
Hittinger, Jacob, Mount Auburn.
Hoar, Samuel, Concord.
Hodgkins, John E., Portsmouth, N.H.
Hoitt, Hon. Charles W., Nashua, N.H.
Hollingsworth, Amor L., Milton.
Hollis, George W., Grantville.
Holmes, Edward J., Boston.
Holt, Mrs. Stephen A., Winchester.
Horner, Mrs. Charlotte N. S., Georgetown.
Horsford, Miss Kate, Cambridge.
Hovey, Charles H., South Pasadena, Cal.
Hovey, Stillman S., Woburn.
Howard, Joseph W., Somerville.
Hubbard, Charles T., Weston.
Hubbard, Charles Wells, Weston.
Hubbard, James C., Everett.
Humphrey, George W., Dedham.
Hunnewell, Arthur, Wellesley.
Hunnewell, Henry Sargent, Wellesley.
Hunnewell, H. Hollis, Wellesley.
Hunnewell, Walter, Wellesley.
Hunt, Dudley F., Reading.
Hunt, Francis W., Melrose.
†Hunt, Franklin, Boston.
Hunt, William H., Concord.
Hyde, James F. C., Newton Highlands.

Jack, John George, Jamaica Plain.
Jackson, Charles L., Cambridge.
Jackson, Robert T., Dorchester.
Janvrin, William S., Revere.
Jenks, Charles W., Bedford.
Johnson, J. Frank, Boston.
Jones, Jerome, Brookline.
Jose, Edwin H., Cambridgeport.
Joyce, Mrs. E. S., Medford.

Kakas, Edward, West Medford.
Kellen, William V., Marion.
Kelly, George B., Jamaica Plain.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
†Kendall, Joseph R., San Francisco, Cal.
Kendall, Dr. Walter G., Atlantic.
Kendrick, Mrs. H. P., Allston.
Kennedy, George G., M.D., Roxbury.
Kent, John, Brookline.
†Keyes, E. W., Denver, Col.
Keyes, John M., Concord.
Kidder, Charles A., Southborough.
Kidder, Nathaniel T., Milton.
†Kimball, A. P., Boston.
King, Franklin, Dorchester.
Kingman, Abner A., Brookline.
Kingman, C. D., Middleborough.
Knapp, Walter H., Newtonville.

Lancaster, Charles B., Newton.
Lawrence, Amory A., Boston.
Lawrence, Amos A., Boston.
Lawrence, James, Groton.
Lawrence, John, Groton.
Learned, Charles A., Arlington.
Lee, Charles J., Dorchester.
Lee, Daniel D., Jamaica Plain.
Lee, Francis H., Salem.
Lee, Henry, Boston.
Leeson, Hon. Joseph R., Newton Centre.
Lemme, Frederick, Charlestown.

Leuchars, Robert B., Brookline.
Lewis, William G., Framingham.
Lincoln, George, Hingham.
Lincoln, Col. Solomon, Boston.
Little, James L., Brookline.
Lockwood, Rhodes, Boston.
Lodge, Richard W., Swampscott.
Loftus, John P., Dorchester.
Loomis, Elihu G., Bedford.
Lothrop, William S. H., Boston.
†Lowder, John, Watertown.
Lowell, Augustus, Boston.
Luke, Elijah H., Cambridgeport.
Lumb, William, Boston.
Lunt, William W., Hingham.
Lyman, George H., Wareham.
Lyon, Henry, M.D., Charlestown.

†Mahoney, John, Boston.
Mallet, E. B., Jr., Freeport, Maine.
Mann, James F., Ipswich.
Manning, Jacob W., Reading.
Manning, J. Woodward, Reading.
Manning, Mrs. Lydia B., Reading.
Manning, Robert, Salem.
Manning, Warren H., Brookline.
Marshall, Frederick F., Chelsea.
Mason, Col. Frederick, Taunton.
Matthews, Nathan, Boston.
May, F. W. G., Boston.
McCarty, Timothy, Providence, R.I.
McClure, John, Revere.
McWilliam, George, Whitinsville.
Melvin, James C., West Newton.
Merriam, Herbert, Weston.
Merriam, M. H., Lexington.
Merrill, Hon. Moody, Roxbury.
Metivier, James, Cambridge.
Milmore, Mrs. Joseph, Washington, D.C.
Minton, James, Boston.
Mitton, Edward J., Brookline.
Mixter, George, Boston.
Monteith, David, Dedham.
Montgomery, Alexander, Natick.
Moore, John H., Concord.
Morgan, George H., New York, N.Y.
†Morse, Samuel F., Boston.
Moseley, Charles H., Dorchester.
Mudge, George A., Portsmouth, N.H.
Murphy, William Bowen, Boston.

Nevins, David, Framingham.
Newman, John R., Winchester.
Newton, Rev. William W., Pittsfield.
Nickerson, George A., Dedham.
Norton, Charles W., Allston.
Norton, Edward E., Boston.

Oakman, Hiram A., North Marshfield.
Olmsted, John Charles, Brookline.

Packer, Charles H., Boston.
Paige, Clifton H., Mattapan.
Palmer, Julius A., Jr., Boston.
Parker, Augustus, Roxbury.
Parker, Charles W., Boston.
Partridge, Horace, North Cambridge.
Patten, Marcellus A., Tewksbury.
Paul, Alfred W., Dighton.
Peabody, Francis H., Boston.
Peabody, John E., Boston.
Peck, O. H., Denver, Col.
Peck, William G., Arlington.
Peirce, Silas, Boston.
Perkins, Edward N., Jamaica Plain.
†Perry, George W., Malden.
Philbrick, William D., Newton Centre.
Pierce, Dean, Brookline.
Pierce, George Francis, Dorchester.
Poor, John R., Boston.
Porter, James C., Wollaston.
Potter, Joseph S., Fredericksburg, Va.
Prang, Louis, Roxbury.
Pratt, Laban, Dorchester.
Pratt, Lucius G., West Newton.
Pratt, Robert M., Boston.
Pray, Dr. Mark W., Boston.
Prescott, Eben C., New York.
Pringle, Cyrus G., Charlotte, Vt.

Prouty, Gardner, Littleton.
Putnam, Joshua H., Newton Centre.

Quinby, Hosea M., M.D., Worcester.

Raddin, Everett W., North Cambridge.
Rand, Miss Elizabeth L., Newton Highlands.
Rand, Harry S., North Cambridge.
Rand, Oliver J., Cambridgeport.
Rawson, Warren W., Arlington.
Ray, James F., Franklin.
Ray, Hon. Joseph G., Franklin.
Raymond, Walter, Boston.
Read, Charles A., Manchester.
Reardon, John B., Boston.
Reed, George W., Boston.
Rice, George C., Worcester.
Richards, John J., Boston.
Richardson, Charles E., Cambridge.
Rinn, J. Ph., Boston.
Ripley, Charles, Dorchester.
Ripley, Ebed L., Hingham Centre.
Robbins, I. Gilbert, Melrose Highlands.
Robinson, John, Salem.
Robinson, Joseph B., Dorchester.
Robinson, Warren J., Somerville.
Ross, Henry, Newtonville.
Ross, Waldo O., Boston.
Ruddick, William H., M.D., South Boston.
Russell, George, Woburn.
Russell, Hon. John E., Leicester.
Russell, Walter, Arlington.

Salisbury, William C. G., Boston.
Sanford, Oliver S., Hyde Park.
Sargent, Charles S., Brookline.
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
Scorgie, James C., Cambridge.
†Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, J. Montgomery, Boston.
Shaw, Christopher C., Milford, N.H.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Siebrecht, H. A., New Rochelle, N.Y.
Simpkins, Hon. John, Yarmouthport.
Skinner, Francis, Boston.
Smith, Benjamin G., Cambridge.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Jamaica Plain.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco, Cal.
Smith, George O., Boston.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Souther, Charles H., Jamaica Plain.
Spaulding, Edward, West Newton.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Sprague, Hon. Charles F., Brookline.
Sprague, Isaac, Wellesley Hills.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M.D., Roslindale.
Stewart, William J., Winchester.
Stone, Charles W., Boston.
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Sturgis, Russell, Manchester.
Sturtevant, E. Lewis, M.D., South Framingham.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Taft, John B., Cambridge.
Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G., M.D., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thompson, Leonard, Woburn.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.

Todd, John, Hingham.
Tolman, Benjamin, Concord.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Trepess, Samuel J., Glencove, L.I., N.Y.
†Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Vander-Woerd, Charles, Waltham.
Vinal, Miss Mary L., Somerville.

Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Miss Mary S., Waltham.
Walley, Mrs. W. P., Boston.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Washburn, Andrew, Hyde Park.
Watson, Benjamin M., Jamaica Plain.
Watson, Thomas A., East Braintree.
Watts, Isaac, Waverly.
Webber, Aaron D., Boston.
Webster, Hollis, Cambridge.
Weld, Christopher Minot, Jamaica Plain.
Weld, George W., Newport, R.I.
Weld, Richard H., Boston.
West, Mrs. Maria L., Neponset.
Weston, Seth, Revere.
Wheeler, Frank, Concord.
Wheeler, Wilfred, Concord.
Wheelwright, A. C., Brookline.
Whitcomb, William B., Medford.
White, Francis A., Brookline.
White, Joseph H., Brookline.
Whitney, Arthur E., Winchester.
Whitney, Ellerton P., Milton.
Whittier, Hon. Charles, Roxbury.
Whittier, George E., Groton.
Wilbur, George B., West Newton.
Wilder, Edward Baker, Dorchester.
Wilder, Henry A., Malden.
Willard, E. W., Newport, R.I.
Willcutt, Levi L., West Roxbury.
Williams, Aaron D., Boston.
Williams, Benjamin B., Boston.
Williams, Philander, Taunton.
Willis, George W., Chelsea.
Willis, Joshua C., Roxbury.
Wilson, Col. Henry W., Boston.
Wilson, William Power, Boston.
Winthrop, Robert C., Jr., Boston.
Wood, William K., West Newton.
Woods, Henry, Boston.
Wright, George C., West Acton.
Wright, John G., Brookline.
Wyman, Oliver B., Shrewsbury.

ANNUAL MEMBERS.

Members of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Adams, Henry Saxton, Dorchester.
Allen, Charles L., Floral Park, N.Y.
Alles, William H., Hyde Park.
Anderson, George M., Milton.
Arnold, Mrs. Anna E., Roxbury.
Arnold, Miss Sarah L., Newton Centre.
Atkinson, Edward, Brookline.

Badlam, William H., Dorchester.
Barker, John G., Melrose.
Benedict, Washington G., Boston.
Bigelow, Arthur J., Eastlake, Worcester.
Bigelow, Mrs. Nancy J., Southborough.
Bird, John L., Dorchester.
Blake, Edward D., Boston.
Bliss, Benjamin K., East Bridgewater.
Blomberg, Carl, North Easton.
Bock, William A., North Cambridge.
Bolles, Matthew, Boston.
Bolles, William P., M.D., Roxbury.
Bouvé, Lander M., Brookline.
Boyden, Clarence F., Taunton.
Braman, George H., Newton.
Breck, Charles H., Newton.
Breck, Charles H. B., Brighton.
Brooks, George, Brookline.
Brown, David H., West Medford.
Butler, Edward, Wellesley.

Carpenter, Frank O., West Roxbury.
Carroll, James T., Chelsea.
Carter, Mrs. Sarah D. J., Wilmington.
Cary, Miss Alice B., Lexington.
Chase, Joseph S., Malden.
Chase, Leverett M., Roxbury.
Chase, Philip A., Lynn.
Chubbuck, Isaac Y., Roxbury.
Clapp, Henry L., Roxbury.
Clark, John Spencer, Boston.
Clark, John W., North Hadley.
Clark, Joseph, Manchester.
Clark, Theodore M., Newtonville.
Clarke, Frederick E., Lawrence.
Collins, Frank S., Malden.
Comley, James, Lexington.
Coolidge, David H., Jr., Boston.
Coolidge, Sumner, Mount Auburn.
Cotter, Lawrence, Dorchester.
Cotting, Charles U., Boston.
Councilman, Prof. W. T., Boston.
Crosby, J. Allen, Jamaica Plain.
Curtis, Joseph H., Boston.
Curtis, Louville, Tyngsborough.

Damon, Frederick W., Arlington.
Davis, Frederick, Boston.
Davis, Frederick S., West Roxbury.
Davis, Thomas M., Cambridgeport.
Dawson, Charles Jackson, Jamaica Plain.
Dimick, Orlendo W., Watertown.
Dolbear, Mrs. Alice J., College Hill.
Doran, Enoch E., Brookline.
Dorr, George B., Boston.

Doyle, William E., East Cambridge.
Duffley, Daniel, Brookline.

Eaton, Warren E., Reading.
Endicott, Miss Charlotte M., Canton.
Ewell, Marshall F., Marshfield Hills.

Faxon, Edwin, Jamaica Plain.
Felton, Arthur W., West Newton.
Fenno, Warren, Revere.
Fisher, Sewall, Framingham.
Fitzgerald, Desmond, Brookline.
Fletcher, Fred W., Auburndale.
Forbes, William H., Jamaica Plain.
French, Charles G., Utica, N.Y.
Frost, Artemas, Belmont.
Frost, George, West Newton.
Frost, Varnum, Arlington.
Fuller, T. Otis, Needham.

Gibbon, Mrs. James A., Brookline.
Gill, Mrs. E. M., Medford.
Gilman, Hon. Virgil C., Nashua, N.H.
Grant, Charles E., Concord.
Grew, Henry Sturgis, Boston.
Grey, Thomas J., Chelsea.

Hall, Charles H., M.D., Boston.
Hall, Stacy, Boston.
Hall, William T., Revere.
Hallstram, Charles W., Boston.
Hargraves, William J., Jamaica Plain.
Harris, Frederick L., Wellesley.
Harrison, Thomas, Melrose Highlands.
Hartwell, Samuel, Lincoln.
Hatfield, T. D., Wellesley.
Henshaw, Samuel, West Brighton, N.Y.
Hersey, Alfred H., Hingham.
Hersey, Edmund, Hingham.
Heustis, Warren H., Belmont.
Hewett, Miss Mary C., Canton.
Hill, J. Willard, Belmont.
Hobbs, George M., Boston.
Hollis, George, South Weymouth.
Horton, Herbert A., Brookline.
Houghton, George S., West Newton.
Hubbard, F. Tracey, Cambridge.
Huston, Miss Katherine W., Jamaica Plain.

Ireland, Robert D., Winthrop.

James, Robert Kent, Dorchester.
Jameson, G. W., East Lexington.
Jones, Dr. Mary E., Boston.

Keith, Miss Mary R., Washington, D.C.
Kemp, William S., Brookline.
Kenrick, Miss Anna C., Newton.

Lancaster, Mrs. E. M., Roxbury.
Lawrence, Henry S., Roxbury.
Lee, William W., Northampton.
Lincoln, Miss Agnes W., Medford.
Lomax, George H., Somerville.
Lombard, Richard T., Wayland.
Loring, Charles G., Boston.
Loring, John A., North Andover.
Loring, William C., Beverly.
Lothrop, Thornton K., Boston.
Low, Hon. Aaron, Hingham.
Lowell, John, Newton.

Manda, W. A., South Orange, N.J.
Manning, A. Chandler, Reading.
Martin, William J., Milton.
Masten, Cornelius E., Roxbury.
McDowell, Mrs. Mary, Cambridge.
McLaren, Anthony, Westwood.
McMullen, Edgar, Boston.
Meriam, Horatio C., D.M.D., Salem.
Merrill, John J., Roxbury.
Milman, William, Roxbury.
Moody, Abner J., Boston.
Moore, George D., Arlington.
Moseley, Frederick Strong, West Newbury.
Munson, Prof. W. M., Orono, Me.
Mutch, John, Brookline.

Newton, John F., Roxbury.
Nicholson, William, Framingham.

Norton, Michael H., Boston.
Norton, Patrick, Boston.

Olmsted, Frederick Law, Brookline.

Park, William D., Boston.
Park, William P., West Boxford.
Parker, John, Newtonville.
Parker, Walter S., Reading.
Patterson, William, Quincy.
Peirce, George H., Concord Junction.
Petremant, Robert, Brooklyn, N.Y.
Pickman, Dudley L., Boston.
Pigott, Thomas E., Winthrop.
Plimpton, Willard P., West Newton.
Power, Charles J., South Framingham.
Prichard, Joseph V., Boston.
Purdie, George A., Wellesley Hills.

Rea, Charles H., Norwood.
Rea, Frederic J., Norwood.
Rich, Miss Ruth G., Dorchester.
Rich, William E. C., Roxbury.
Rich, William P., Chelsea.
Richards, Mrs. P. D., West Medford.
Robbins, Oliver R., Weston.
Robinson, Walter A., Arlington.
Ross, Charles W., Newtonville.
Ross, Henry Wilson, Newtonville.
Rothwell, James E., Brookline.

Sander, Charles, Brookline.
Saunders, Miss Mary T., Salem.
Sawtelle, J. M., Fitchburg.
Scott, Augustus E., Lexington.
Scudder, Samuel H., Cambridge.
Searles, E. F., Methuen.
Seaver, Edwin P., LL.D., Waban.
Sharples, Stephen P., Cambridge.
Shaw, Hon. Edward P., Newburyport.
Sheppard, Edwin, Lowell.
Smith, Archibald, Somerville.
Southworth, Edward, Quincy.
Squire, Miss Esther A., North Cambridge.
Stearns, Mrs. Charles A., East Watertown.
Stearns, Charles H., Brookline.
Stevens, Mrs. Mary L., Cambridge.
Stevens, Miss Mary O., North Andover.
Stone, Joshua C., Watertown.
Storer, Charles, Providence, R.I.
Story, Miss Sarah W., Brighton.
Swan, Charles W., M.D., Brookline.

Tailby, Joseph, Wellesley.
Teele, William H., West Acton.
Terry, Rev. Calvin, North Weymouth.
Toby, Rufus T., Roxbury.
Travis, Charles B., Brighton.
Tyndale, Theodore H., Brookline.

Vaughan, J. C., Chicago, Ill.

Walsh, Michael H., Wood's Holl.
Warren, Samuel H., Weston.
Welch, Patrick, Dorchester.
Wells, Benjamin T., Newtonville.
Westwood, Thomas H., Jamaica Plain.
Wheeler, Henry A., Newtonville.
Wheeler, James, Brookline.
White, Maurice P., Roxbury.
White, W. Henry, Lowell.
Whitney, Joseph, Cambridgeport.
Whiton, Hon. Starkes, Hingham Centre.
Wilkie, Edward A., Newtonville.
Winter, William C., Mansfield.
Wolcott, Mrs. H. L. T., Dedham.
Wood, Mrs. Anna D., West Newton.
Wood, Elijah A., West Newton.
Wood, E. W., West Newton.
Woodford, Joseph H., Boston.
Woods, Henry F., Boston.
Worthington, Roland, Roxbury.

Young, Arthur W., Hingham.
Young, Charles S., Newton Centre.
Young, E. Bentley, Boston.

Zirngiebel, Denys, Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXII.

Life Members.

The payment of thirty dollars shall constitute a Life Membership and exempt the member from all future assessments, and any Annual Member, having paid all dues, may become a Life Member by the payment of twenty dollars in addition thereto.

Annual Membership.

Every Annual Member, before he receives his diploma or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIII.

Withdrawal or Discontinuance of Membership.

Any member may withdraw from the Society, on giving notice to the Treasurer and paying the amount due from him. Any member who shall neglect for the space of two years to pay his annual assessment, after due notice from the Treasurer, shall cease to be a member. The Treasurer shall give notice of such withdrawals or discontinuances to the Secretary, who shall erase such members' names from the list.

The attention of Annual Members is particularly called to Section XXIII.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Joseph Maxwell, *elected in* 1830, *and* George W. Smith, *elected in* 1851.

Hon. George S. Boutwell, Groton.
H. W. S. Cleveland, Chicago, Ill.
Major L. A. Huguet-Latour, M.P., Montreal, Canada.
Joseph Jefferson, Buzzard's Bay.
Joseph Maxwell, Rio Janeiro, Brazil.
Donald G. Mitchell, New Haven, Conn.
Hon. J. Sterling Morton, Ex-Secretary of Agriculture, Washington, D.C.
Baron R. Von Osten Sacken, Heidelberg, Germany.
Samuel B. Parsons, Flushing, N.Y.
George W. Smith, Boston.
Hon. James Wilson, Secretary of Agriculture, Washington, D.C.

CORRESPONDING MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly reporting to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Alexander Burton, *elected in* 1829, S. Reynolds, M.D., 1832, *and* Francis Summerest (or Summerer), 1833.

Édouard André, Editor in Chief of the Revue Horticole, Paris, France.

Professor L. H. Bailey, Horticultural Department, Cornell University, Ithaca, N.Y.

Charles Baltet, Président de la Société Horticole, Vigneronne, et Forestière de l'Aube, Troyes, France.

Napoleon Baumann, Bolwiller, Alsace.

D. W. Beadle, 303 Crawford St., Toronto, Ontario.

Professor William J. Beal, Agricultural College, Michigan.

Prosper J. Berckmans, Ex-President of the American Pomological Society, Augusta, Ga.

Charles E. Bessey, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.

Dr. Ch. Bolle, Berlin, Prussia.

John Croumbie Brown, LL.D., Haddington, Scotland.

Professor J. L. Budd, Secretary of the Iowa Horticultural Society, Ames.

William Bull, Chelsea, England.

Alexander Burton, United States Consul at Cadiz, Spain, Philadelphia.

Isidor Bush, Bushberg, Jefferson Co., Mo.

George W. Campbell, Ex-President of the Ohio State Horticultural Society, Delaware, O.

Maxime Cornu, Director of the Jardin des Plantes, Paris, France.

Benjamin E. Cotting, M.D., Boston.

Daniel T. Curtis, Dorchester.

Rev. H. Honywood D'Ombrain, Westwell Vicarage, Ashford, Kent, England.

Malcolm Dunn, Dalkeith, Scotland.

W. T. Thiselton Dyer, C.M.G., F.R.S., Director of the Royal Botanic Gardens, Kew, England.

Parker Earle, President of the American Horticultural Society, Roswell, N.M.

George Ellwanger, Rochester, N.Y.

Henry John Elwes, F.L.S., F.Z.S., Colesborn, Andoversford, Gloucestershire, England.

William G. Farlow, M.D., Professor of Cryptogamic Botany, Harvard University, Cambridge.

B. E. Fernow, Chief of the Division of Forestry, Department of Agriculture, Washington, D.C.

Hon. Robert W. Furnas, Ex-President of the Nebraska State Horticultural Society, Brownville.

Charles A. Goessmann, Ph.D., LL.D., Chemist of the Hatch Experiment Station of the Massachusetts Agricultural College, Amherst.

George L. Goodale, M.D., Professor of Botany, Harvard University, Cambridge.

Obadiah B. Hadwen, President of the Worcester County Horticultural Society, Worcester.

Professor Byron D. Halsted, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N.J.

J. H. Hart, Superintendent of the Botanic Garden, Trinidad.

Dr. F. M. Hexamer, Editor American Agriculturist, New York.

J. W. Hoffmann, Colored State University, Orangeburg, S.C.

J. C. Holding, Ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.

The Very Rev. S. Reynolds Hole, D.D., Dean of Rochester, Rochester, England.

Sir Joseph Hooker, K.C.S.I., The Camp, Sunningdale, England.

Josiah Hoopes, West Chester, Pa.

George Husmann, Napa, Cal.

William J. Johnson, M.D., Fort Gaines, Ga.

Charles Joly, Vice-President of the Société Nationale d'Horticulture de France, Paris.

Sir George King, Superintendent of the Royal Botanic Garden, Calcutta.

Professor William R. Lazenby, Secretary of the Agricultural Experiment Station, Columbus, O.

Max Leichtlin, Baden-Baden, Germany.

G. F. B. Leighton, President of the Norfolk Horticultural and Pomological Society, Norfolk, Va.

Victor Lemoine, Nancy, France.

J. Linden, Ghent, Belgium.

T. T. Lyon, Honorary President of the Michigan Horticultural Society, South Haven.

Dr. Peter MacOwan, F.L.S., Director of the Botanic Garden, Cape Town, Africa.

Dr. Maxwell T. Masters, Editor of the Gardeners' Chronicle, London.

George Maw, Benthal, Kinley, Surrey, England.

T. C. Maxwell, Geneva, N.Y.

Thomas Meehan, Germantown, Pa.

Dr. Charles Mohr, Mobile, Ala.

DR. DANIEL MORRIS, C.M.G., D.Sc., M.A., F.L.S., Assistant Director of the Royal Botanic Gardens, Kew, England.

CH. NAUDIN, Antibes, France.

GEORGE NICHOLSON, Curator of the Royal Botanic Gardens, Kew, England.

WILLIAM PAUL, Waltham Cross, London, N.

PROFESSOR D. P. PENHALLOW, Director of the Botanic Garden, Montreal, Canada.

HENRY PROBASCO, Cincinnati, O.

P. T. QUINN, Newark, N.J.

CAVALIÈRE ENRICO RAGUSA, Palermo, Sicily.

D. REDMOND, Ocean Springs, Miss.

S. REYNOLDS, M.D., Schenectady, N.Y.

WILLIAM ROBINSON, Editor of The Garden, London.

EDGAR SANDERS, Chicago, Ill.

WILLIAM SAUNDERS, Department of Agriculture, Washington, D.C.

WILLIAM R. SMITH, Curator of the Botanic Garden, Washington, D.C.

ROBERT W. STARR, Port William, N.S.

DR. JOSEPH STAYMAN, Leavenworth, Kan.

FRANCIS SUMMERBST.

WILLIAM SUMNER, Pomaria, S.C.

WILLIAM TRELEASE, Director of the Missouri Botanic Garden, St. Louis.

DR. MELCHIOR TREUB, Director of the Botanic Garden, Buitenzorg, Java.

H. J. VEITCH, Chelsea, England.

HENRY L. DE VILMORIN, Secretary of the Société Nationale d'Agriculture de France, Paris.

CONTENTS.

PAGE

BUSINESS MEETING, April 3, 1897; Report on Portrait of President Kidder, p. 137; Request by Committee on Lectures and Publication, 137; Annual Report of Treasurer read, 137; Decease of E. W. Lincoln, Charles Eliot, and Dr. Robert Hogg announced, 137, 138; Awards to others than members, 138; Seven members elected 138

BUSINESS MEETING, May 22; Request and Call for Special Meeting, pp. 139, 140; Committee on School Gardens, etc., 140; Votes concerning bequest of Francis B. Hayes, 140, 141; Vote of Thanks 141

BUSINESS MEETING, July 3; Resignation of Chairman of Garden Committee and Election of successor, p. 142; Report on awards to others than members, 142; Memorial of E. W. Lincoln, 142, 143; Memorial of Charles Eliot, 143, 144; Letter concerning meeting of the American Association for the Advancement of Science and Vote thereon, 144, 145; Committee on Nominations, 145; Letters from Mrs. C. Eliot and R. M. Hogg, 145; Decease of Hon. J. S. Fay and Robert Douglas announced, 145; Vote concerning payment of Garden Committee, 145; Five members elected, 146; Election of Honorary and Corresponding Members 146

BUSINESS MEETING, September 4; Report of Nominating Committee, p. 146; Memorial of Hon. J. S. Fay, 146, 147; Decease of S. R. Payson and E. W. Buswell announced 147

BUSINESS MEETING, October 2; Annual Election, pp. 147, 149; Transfer of Appropriation voted, 148; Memorial of Robert Douglas, 148; Letter from J. S. Fay, Jr., 148; Vote requiring meetings of Awarding Committees, 149; Committees on Memorials to S. R. Payson and E. W. Buswell, 149; Ten members elected, 149

BUSINESS MEETING, November 6; Memorial of S. R. Payson, p. 150; Appropriations for 1898, 150, 151; Three members elected 151

BUSINESS MEETING, December 4; Memorial of E. W. Buswell, pp. 151, 152; Report of Fruit Committee read, 152; Report from Committee on Establishing Prizes, 152, 153; Thanks for offer of Prizes, 153; Book from J. H. Veitch, 153; Six members elected 153

BUSINESS MEETING, December 18, 1897; Vote concerning Reports of Committees, p. 154; Reports of Committees and of Secretary and Librarian presented . 154

REPORT OF COMMITTEE ON PLANTS; Introduction, p. 155; Saturday Exhibitions, 155, 156, 157, 158; Spring Exhibition, 156; Rose and Strawberry Exhibition, 157; Annual Exhibition of Plants and Flowers, 157; Chrysanthemum Exhibition, 157; Financial Statement, 158; Prizes and Gratuities awarded . . 159–168

PAGE

REPORT OF COMMITTEE ON FLOWERS; Introduction, pp. 169, 170; Saturday Exhibitions, 170, 171, 173, 174, 175; Spring Exhibition, 171; May Exhibition, 171; Rhododendron Show, 171, 172; Peony Show, 172; Rose and Strawberry Exhibition, 172, 173; Aquatic Exhibition, 174, 175; Annual Exhibition of Plants and Flowers, 175; Chrysanthemum Show, 176; Financial Statement, 176; Prizes and Gratuities awarded 177–196

REPORT OF COMMITTEE ON FRUITS, pp. 197, 198; Prizes and Gratuities awarded, 199–215

REPORT OF COMMITTEE ON VEGETABLES, pp. 216–219; Prizes and Gratuities awarded 220–236

REPORT OF COMMITTEE ON SCHOOL GARDENS AND CHILDREN'S HERBARIUMS; George Putnam School Garden, pp. 237, 238; Medford School Gardens, 238, 239; Other School Gardens, 239, 240; Children's Herbariums, 237–241; Prizes and Gratuities awarded 242, 243

REPORT OF COMMITTEE OF ARRANGEMENTS 244, 245

REPORT OF DELEGATE TO STATE BOARD OF AGRICULTURE 246–249

REPORT TO THE STATE BOARD OF AGRICULTURE 250–252

REPORT OF THE COMMITTEE ON THE LIBRARY 253, 254

REPORT OF THE SECRETARY AND LIBRARIAN 255–258

REPORT OF TREASURER AND FINANCE COMMITTEE 259–263

MOUNT AUBURN CEMETERY 264, 265

OFFICERS AND STANDING COMMITTEES FOR 1898 266–268

MEMBERS OF THE SOCIETY; Life, pp. 269–275; Annual, 276–278; Honorary, 280; Corresponding 281–283

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS 279

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1897.

PART III,

BEING THE LIST OF

ACCESSIONS TO THE LIBRARY

DURING THE YEAR.

BOSTON:
PRINTED FOR THE SOCIETY.
1903.

LIBRARY ACCESSIONS, 1897.

In the following list the books purchased from the income of the Stickney Fund are marked S. F., and those purchased from the Society's Library Appropriation, L. A. All other publications were received by donation and exchange, the name of the donor being given in every instance when known.

The size of books is denoted by the terms fol., 4°, 8°, 12°, etc. Pamphlets are understood to be 8° unless otherwise stated.

ABBREVIATIONS.

ann. — annual.
bul. — bulletin.
cl. — cloth.
col. — colored.
ed. — edition.
Edinb. — Edinburgh.
fol. — folio.
frontis. — frontispiece.
lib'n. — librarian.
Lond. — London.
N. Y. — New York.
Phila. — Philadelphia.
pl. — plates.
pph. — pamphlet.
port. — portrait.
pres. — president.
rep't. — report.
San Fran. — San Francisco.
sec'y. — secretary.
ser. — series.
Strasb. — Strasburg.
Wash. — Washington.

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PERIODICALS PURCHASED.

AMERICAN.—Garden and Forest.
Meehan's Monthly.
Fern Bulletin.
Country Gentleman.
American Naturalist.
American Journal of Science.

ENGLISH. — Gardeners' Chronicle.
Gardeners' Magazine.
Journal of Horticulture.
The Garden.
Gardening Illustrated.
Gardening World.
Orchid Review.
Curtis's Botanical Magazine.
Journal of Botany.
Nature.

FRENCH. — Revue Horticole.
Lyon Horticole.
Revue des Eaux et Forêts.
Journal des Roses.

BELGIAN. — Revue de l' Horticulture Belge et Étrangère.
La Semaine Horticole.

GERMAN. — Botanische Zeitung.

PERIODICALS RECEIVED IN EXCHANGE.

AMERICAN.— American Gardening.
Gardening.
Amateur Gardening.
How to Grow Flowers.
Vick's Illustrated Monthly Magazine.
The Mayflower.
Success with Flowers.
National Nurseryman.
Northwest Horticulturist.
Eastern New York Horticulturist.

PERIODICALS RECEIVED IN EXCHANGE, *continued.*

Southern Florist and Gardener.
Canadian Horticulturist.
American Florist.
Florists' Exchange.
Florist's Review.
New England Florist.
Sharon Cactus Guide.
Green's Fruit Grower.
Strawberry Culturist.
Grape Belt.
Montana Fruit Grower.
Park and Cemetery.
Botanical Gazette.
Plant World.
Asa Gray Bulletin.
Erythea.
Pittonia.
Massachusetts Ploughman.
New England Farmer.
American Cultivator.
New England Homestead.
Maine Farmer.
Rural New-Yorker.
Farm Journal.
California Cultivator.
Prairie Farmer.
Maryland Farmer.
National Stockman and Farmer.
Irrigation Age.
The Industrialist.
Canadian Entomologist.
Ottawa Naturalist.
West American Scientist.
Boston Evening Transcript.
Boston Morning Journal.
Boston Daily Globe.
Boston Daily Advertiser.
Boston Traveler.
Boston Times.

FOREIGN. — Garden and Field (Adelaide, So. Australia.)
Queensland Agricultural Journal.
New South Wales Agricultural Gazette.
Indian Gardening.

LIST OF BOOKS WANTED

BY THE

MASSACHUSETTS HORTICULTURAL SOCIETY.

☞ *Persons having any of the books in the following list to dispose of will oblige by addressing the "Librarian of the Massachusetts Horticultural Society, 300 Massachusetts Ave., Boston."*

Album de Pomologie, Vol. 2.

Amateur World of Horticulture. Title-page and Index to Vol. II.

American Agricultural Annual. Nos. 1 and 2, 1867 and 1868.

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American Cemetery Superintendents, Association of. Proceedings of 8th Annual Convention, 1894.

American Farmer. Fifth series. Vol. 3, Nos. 7–12, January to June, 1862, and the succeeding volumes to 1873, inclusive, also the numbers for October and December, 1877, and April to December, inclusive, 1878.

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California State Board of Forestry. First Biennial Report. 1885–'86.

Christie, Thomas. New Commercial Plants. No. 12.

Colorado State Board of Horticulture. Ann. Rep't. for 1900.

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No. 4. A List of the Plants collected by Miss Mary B. Croft, at San Diego, Texas. (Except "Additions.")

No. 12. The Genus Eleocharis, etc.

No. 23. The American Species of the Genus Anemone, etc.

No. 34. The North American Species of Lespedeza.

Connecticut State Agricultural Society. Transactions, 1857–'59.

Debeaux, O. Contributions a la flore de la Chine. Fasciculus 4.

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Farm and Garden. July and subsequent numbers. New York: 1853.

Fielding, H. B., assisted by George Gardner. Sertum plantarum. All that was published of Vol. II.

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Gardener, The. A magazine of Horticulture and Floriculture. Edited by David Thomson. Index to the volume for 1878.

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Georgia Horticultural Society. Proceedings of the 4th and 7th Annual Meetings.

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Horticultural Times and Covent Garden Gazette. Vol. 1, No. 1 and title-page and index; Vol. 2, title-page and index; Vol. 12, No. 311 and title-page and index; Vol. 14, title-page and index; Vol. 15, title-page and index; Vol. 16, title-page and index; Vol. 17, title-page and index, and all later than Vol. 17, No. 404.

Illinois Entomological Reports; First, by B. D. Walsh, for 1867.

Indiana Horticultural Society. Transactions at the first eight sessions, previous to 1870, except the 3d, 5th, 6th, 7th, and 9th for 1864, 1866, 1867, 1868, and 1870.

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Irrigation Age. Vols. 1–4 inclusive; Vol. 5, Nos. 2–5 and 8, June–September and December, 1893; Vol. 9, No. 5, May, 1896; Vol. 11, Nos. 4–9, April–September, 1897.

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Leopoldina. Vols. I–XVII.

L'Héritier, C. L. Stirpes Novæ. Fasc. 5 and 6, pp. 103–184, plates 49–84.

Lincoln Park (Chicago). Reports for 1881–2 to 1885–6. Also all previous to 1879–80.

Louisiana State Agricultural Society. Proceedings of 1st to 4th, and 11th Annual Sessions (1887–90) and 1897.

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Maryland Farmer. Vol. XII, No. 3, March, 1875.

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Massachusetts Fruit Growers' Association. 1st and 2d Annual Reports.

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New Hampshire Forest Commission. 1st rep't. of the present Commission, for 1893.

New Jersey Forestry, Reports on. (From Reports of N. J. Geological Survey). All previous to 1894.

New Jersey Horticultural Society. Annual Reports. 5th and 14th sessions, 1880 and 1888.

New York Farmer. Vol. 3, New Series, 1835, pp. 33–64.

New York Farmers. Proceedings, 1882–'84 (1st vol.), and 1893–'94.

New York State Agricultural Society. Journal. Vol. 13, Nos. 10, 11, and 12. Vol. 14, Nos. 3, 5, 7, and 9–12. Vol. 15, Nos. 3, 4, 6, 7, and 12. Vol. 16, No. 2; and the whole of Vols. 17, 18, and 19.

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Northwest Fruit Growers' Association. 2nd to 7th Reports.

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Ohio State Board of Agriculture. Annual Reports: 1st and 3d, 1846 and 1848; 6th–8th, 1851–1853; 10th, 1855; 25th–34th, 1870–1879.

Ontario Department of Agriculture. Bureau of Industries. 1st to 4th Annual Reports, 1882–1885.

Ontario Fruit Growers' Association. Reports previous to 1869 and 2d Report, 1871.

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Oregon State Board of Horticulture, 3d Biennial Report, 1895.

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Ortega, C. G. Novarum aut rariorum plantarum horti Matritensis, etc. Decades 5–10 inclusive.

Ortolano, L'. October and November numbers for 1864. Trieste.

Our Country Home. Vol. 5, No. 4; Vol. 8, No. 4; Vol. 9, Nos. 6 and 9; Vol. 10, Nos. 8, 10, 11, and 12.

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Pennsylvania Fruit Growers' Society. Reports previous to 1867.

Phytologist, The. General Index to the 2d Series.

Piper, R. U., M.D. The Trees of America. No. 3. 4to. Boston: 1858.

Plenck, J. J. Icones plantarum medicinalium, etc. Vol. 6, except fascicles 1–3; Vol. 7; Vol. 8.

Plow, The. Vol. 1, No. 1. New York: 1852.

Pomologie Française, La. Series 1 to 3, inclusive.

Purdy's Fruit Recorder. Vol. 1, 1869; Vols. 1–3 (2d ser. ?), 1891–93; and also 1874 wants Nos. 5 and 6; 1878, No. 6; 1894, Nos. 2 and 8–12; 1895, Nos. 2–12.

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Rafinesque, C. S. Atlantic Journal, Nos. 1, 4, 5, 6, 7, and 8. Philadelphia, 1832, 1833.

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——— — —. New Flora of North America. Parts 1, 2, and 3. Philadelphia, 1836.

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Rural California. All after March, 1895.

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Sarthe, Bulletin de la Société d' Horticulture de la. All previous to 1870, being Vols. 1–7; title-page and contents to Vol. 9 (1874–1877); title-page to Vol. 10, (1878–1884); title-page to Vol. 12, (1891–1895).

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Seine-Inférieure, Bulletin de la Société centrale d'Horticulture du Département de la. (*Formerly* Société d'Horticulture de Rouen). Tome 5, cahier 4 (1855 or '56); Tome 7, cahier 1 (1860); Tome 14, cahier 2 of 1872, pp. 285–332; title-pages to Vols. 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13 and 14; tables of Contents to Vols. 6 and 7. [Also] Tome 1 de la Pomologie, cahiers 2, 3 (being respectively cahiers 3 and 6 of Vol. 2 of Bul. Soc. cent. d'Hort.) and 6; Tome 2, cahiers 3 and 4, and title-page and table of contents.

Semi-Tropic California. Vols. 1 and 2, 1878 and 1879, and January, 1881, and March, 1882.

Sociedad Rural Argentina. Anales de la. Vols. 1–15.

Southern Florist and Gardener. Nos. 6 and 12 of Vol. 1 and Nos. 5 and 6 of Vol. 2.

Sowerby's English Botany, Supplement to the 1st edition; Vol. 5, including plates 2961–2995.

Sweet, Robert. Geraniaceæ. Vol. 5.

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CONTENTS.

	PAGE
GENERAL HORTICULTURE,	287, 288
Horticultural Journals,	289
Horticultural Societies,	289–291
FLOWERS AND ORNAMENTAL PLANTS,	292, 293
Floricultural Societies,	293
FRUITS,	293, 294
Fruit Growers' Societies,	294
VEGETABLES,	294, 295
LANDSCAPE GARDENING, ETC.,	295
PARKS AND CEMETERIES,	295, 296
TREES,	296, 297
FORESTRY,	297
Forestry Associations, Etc.,	298
GENERAL AGRICULTURE,	298, 299
TROPICAL AGRICULTURE,	299, 300
SOILS, FERTILIZERS, ETC.,	300
Agricultural Journals,	301
Agricultural Societies, Boards, Etc.,	301–314
Agricultural Experiment Stations, Colleges, Etc.,	314–317
INSECTS,	317
PLANT DISEASES,	318
GENERAL BOTANY,	318, 319
ELEMENTARY BOTANY,	319
ECONOMIC BOTANY,	319
TERRITORIAL BOTANY,	320–325
PHYSIOLOGICAL BOTANY,	325
CRYPTOGAMIC BOTANY,	326–329
BOTANICAL MONOGRAPHS,	329
Botanical Journals,	329
Botanical Societies,	330
Botanic Gardens,	330, 331
TRAVELS,	331, 332
NATURAL HISTORY SOCIETIES, ETC.,	332, 333
MISCELLANEOUS,	333–335
PERIODICALS,	335, 336
LIST OF BOOKS WANTED BY THE SOCIETY,	337, 344
DUPLICATE BOOKS FOR SALE,	345

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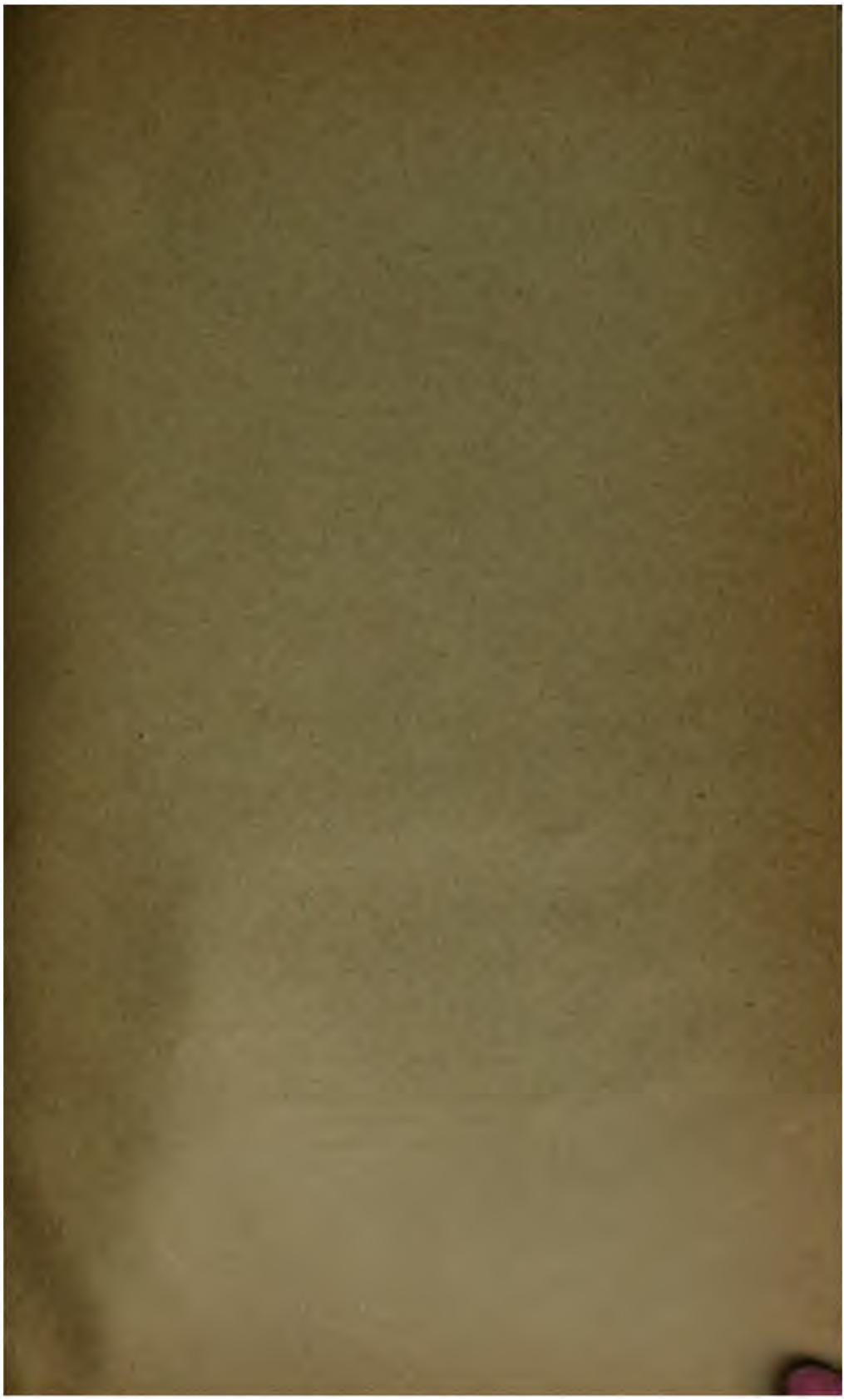

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